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NATIONAL DAM SAFETY PROGRAM. UNTERMEYER DAM (NJ00253), PASSAIC --ETC(U)
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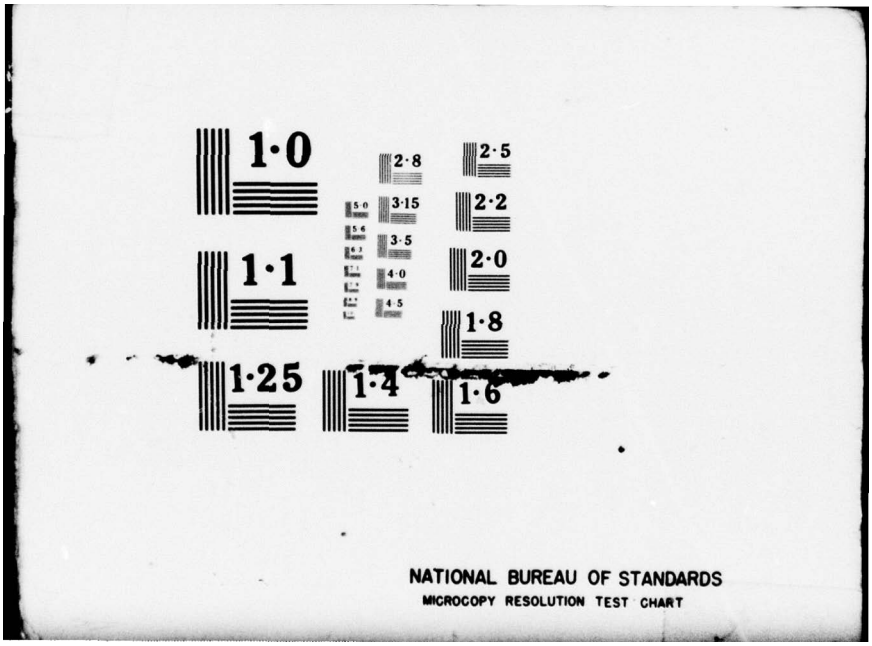
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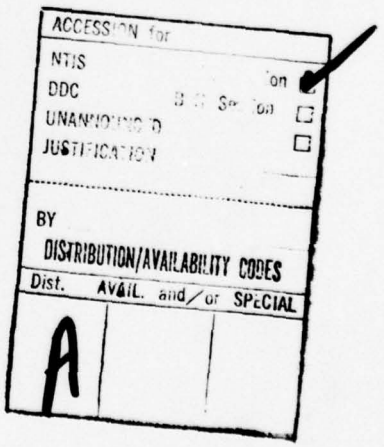

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: NJ00253	2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE *(and Subtitle)*: Phase I Inspection Report National Dam Safety Program Untermeyer Lake Dam Morris County, N.J.	5. TYPE OF REPORT & PERIOD COVERED: FINAL report
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): Dennis J. Leary P.E.	8. CONTRACT OR GRANT NUMBER(s): DACW61-78-C-0124
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Langan Engineering Associates Inc. 970 Clifton Ave. Clifton, N.J. 07013	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 6
11. CONTROLLING OFFICE NAME AND ADDRESS: U.S. Army Engineer District, Philadelphia Custom House, 2d & Chestnut Streets Philadelphia, Pennsylvania 19106	12. REPORT DATE: July 1978
	13. NUMBER OF PAGES: 77
14. MONITORING AGENCY NAME & ADDRESS *(if different from Controlling Office)*: 12 100p.	15. SECURITY CLASS. *(of this report)*: Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

Approved for public release; distribution unlimited.

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17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

6 National Dam Safety Program. Untermeyer Dam [redacted] (NJ00253), Passaic River Basin, East Ditch, Morris County, New Jersey. Phase I Inspection Report.

18. SUPPLEMENTARY NOTES

Copies are obtainable from National Technical Information Service, Springfield, Virginia, 22151.

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

Dams--New Jersey
National Dam Safety Program Phase I
Dam Safety
Dam Inspection
Untermeyer Lake Dam, N.J.

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.

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SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE--2 D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

41905

IN REPLY REFER TO

NAPEN-D

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, New Jersey 08621

31 AUG 1978

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Untermeyer Dam in Morris County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, Untermeyer Dam initially listed as a "high" hazard potential structure, but reduced to "significant" hazard potential as a result of this inspection, is now judged to be in UNSAFE, non-emergency condition. The dam's spillway is considered seriously inadequate since 21 percent of the Probable Maximum Flood(PMF) would overtop the dam even though the lake has been drawn down about 4-feet. Also, the dam's stability is considered questionable by the personnel (consulting engineer's staff, State and Federal engineers) who inspected this structure. To insure adequacy of the structure, the following actions, as a minimum, are recommended:

a. Because of the concern for the stability of the embankment at or near the original lake level, the spillway notch should be increased in size by the owner, within one month from the date of approval of this report, until investigations, studies and remedial measures contained herein are accomplished. The present spillway notch of approximately 3.5-feet wide by 4-feet deep should be enlarged to approximately 30-feet wide by 4-feet deep. This is intended to provide adequate spillway capacity for at least the 1/2 PMF. Prior to widening the notch, a detailed reconnaissance of the downstream area should be made to assure the high flows that would pass through the enlarged opening will not cause serious downstream damage. A detailed emergency operation and warning system should be promptly developed. Also, during periods of unusually heavy precipitation, around-the-clock surveillance should be provided.

b. Hydrologic and hydraulic investigations and studies by a qualified professional consultant, engaged by the owner, utilizing more precise and sophisticated methods and procedures should be performed to insure that the adopted remedial measures will provide adequate hydraulic capacity and prevent the dam's overtopping. Provision of low level outlet should be included as part of these remedial measures to allow drawdown in case of emergency or for remedial work.

c. Engineering investigations and studies, including a complete topographic survey of the structure, subsurface explorations to define the nature of the materials within the embankment and foundation, piezometeric investigations and stability anaylsis should be performed. Any remedial actions necessitated as a result of these investigations and studies should be incorporated into the structure.

d. Removal of trees and brush from the entire dam embankment and the establishment of suitable ground cover should be made part of the remedial work.

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congresswoman Helen S. Meyner of the Thirteenth District. Under the provisions of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, thirty days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia, 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

An important aspect of the Dam Safety Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely yours,

James G. Ton

1 Incl
As stated

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

Cy furn:
Mr. Dirk C. Hofman, P.E.
Department of Environmental Protection

UNTERMEYER DAM (NJ00253)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 8, 12, and 29 June 1978 also, on 3 and 6 July 1978 by Langan Engineering Associates, Inc., under contract to the State of New Jersey. The state, under agreement with the U. S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

During the 29 June 1978 inspection, Langan Engineering field personnel observed a serious leakage, estimated at 15 gpm, from a single source on the downstream face of the earth embankment. The source was located four feet below the crest in the center portion of the dam. This leak was not apparent during the earlier inspections and therefore it was considered to have deteriorated progressively between the time of the first inspection and 29 June 1978. Langan Engineering immediately notified N. J. Dept. of Environmental Protection, Bureau of Flood Plain Management personnel who in turn notified U.S. Army Engineer District, Philadelphia personnel. Together, State and Corps engineers investigated and monitored the condition of the leak on the evening of 29 June and during the day of 30 June 1978. As a result of these site visits, it was the unanimous opinion of both the State and Corps' engineers that the condition appeared to be worsening (increased flow with some fines evident) and that an "UNSAFE-EMERGENCY" condition (i.e. imminent danger of failure, with possible loss of life) be immediately reported. *The District Engineer*, notified the Governor of New Jersey, the Honorable Brendan T. Byrne, by telegram of the UNSAFE condition on 30 June 1978 (Copy attached to this assessment) (Also, "UNSAFE DAM" data sheets where submitted to the U.S. Army Engineer Division North Atlantic on 30 June, 3 and 6 July 1978. Copies of these sheets are attached). Meanwhile, State officials notified the owner of the dam of the condition and ordered an immediate drawdown of the lake behind the dam until the leakage stopped. The owner's contractor started cutting a notch in the dam's masonry spillway on the evening of 30 June 1978. (See attached photos). By the morning of 1 July 1978, the lake had receded 6-inches and the leakage abated. However, due to poor overall condition of the dam and indications of seepage at various locations along the dam's downstream toe, it was deemed prudent to lower the lake level a total of four feet by deepening the spillway notch. On 6 July 1978, the lake had been lowered four feet and the condition of the dam, while still UNSAFE, was judged"non-emergency."

The Untermeyer Dam initially listed as a "high" hazard potential structure, but reduced to "significant" hazard potential as a result of this inspection, is now judged to be in UNSAFE, non-emergency condition. The dam's spillway is considered seriously inadequate since 21 percent of the Probable Maximum Flood(PMF) would overtop the dam even though the lake has been drawn down about 4-feet. Also, the dam's stability is considered questionable by the personnel (consulting engineer's staff, State and Federal engineers) who inspected this structure. To insure adequacy of the structure, the following actions, as a minimum, are recommended:

a. Because of the concern for the stability of the embankment at or near the original lake level, the spillway notch should be increased in size by the owner, within one month from the date of approval of this report, until investigations, studies and remedial measures contained herein are accomplished. The present spillway notch of approximately 3.5-feet wide by 4-feet deep should be enlarged to approximately 30-feet wide by 4-feet deep. This is intended to provide adequate spillway capacity for at least the 1/2 PMF. Prior to widening the notch, a detailed reconnaissance of the downstream area should be made to assure the high flows that would pass through the enlarged opening will not cause serious downstream damage. A detailed emergency operation and warning system should be promptly developed. Also, during periods of unusually heavy precipitation, around-the-clock surveillance should be provided.

b. Hydrologic and hydraulic investigations and studies by a qualified professional consultant, engaged by the owner, utilizing more precise and sophisticated methods and procedures should be performed to insure that the adopted remedial measures will provide adequate hydraulic capacity and prevent the dam's overtopping. Provision of low level outlet should be included as part of these remedial measures to allow drawdown in case of emergency or for remedial work.

c. Engineering investigations and studies, including a complete topographic survey of the structure, subsurface explorations to define the nature of the materials within the embankment and foundation, piezometeric investigations and stability anaylsis should be performed. Any remedial actions necessitated as a result of these investigations and studies should be incorporated into the structure.

d. Removal of trees and brush from the entire dam embankment and the establishment of suitable ground cover should be made part of the remedial work.

APPROVED: James G Ton

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

DATE: 31 Aug 79

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PMS HONORABLE BRENDAN T. BYRNE

GOVERNOR OF NEW JERSEY

TRENETON, NJ 08620

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INSPECTIONS PERFORMED ON 29 AND 30 JUNE 1978 OF THE UNTERMEYER DAM (U.S.I.D. NO. NJ 00243), LOCATED ABOUT SIX MILES NORTH OF BOONTON, MORRIS COUNTY, NEW JERSEY, REVEALED AN INCREASING AMOUNT OF LEAKAGE IN THE DAM'S DOWNSTREAM SLOPE. THIS LEAKAGE IS CONSIDERED SUFFICIENT EVIDENCE OF DISTRESS AS TO WARRANT IMMEDIATE DRAWDOWN OF THE POOL TO PRECLUDE POSSIBILITY OF FAILURE WITH RESULTING PROPERTY DAMAGE AND LOSS OF LIFE.-

HARRY V. DUTCHYSHYN, COLONEL, CORPS OF ENGINEERS, ARMY CORPS OF ENGINEERS, CUSTOM HOUSE, 2ND & CHESTNUT STREET, PHILADELPHIA, PA 19106

ACCEPTED

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1-PC

UNSAFE DAM

NATIONAL PROGRAM OF INSPECTION OF DAMS

FIRST REPORT

a. Name: Untermeyer Dam

b. Type: Combination - Earth and Stonewall c. Height: 18+ feet d. Id. No.: NJ00253

e. Location

State: New Jersey County: Morris

Nearest D/S City, Town, or Village: Pequannock

River or Stream: East Ditch

f. Owner: Brooks-Podesta Trust, P.O. Box AK, Montclair, NJ 07042

g. Date Governor Notified of Unsafe Condition: 30 June 1978 (Telephone & Telegram)

h. Condition of Dam Resulting in Unsafe Assessment: Leak (approx. 15-20 gpm) observed in downstream slope about 4-feet below crest and 3-feet below lake level. Leak observed by State A/E on 6/29. A/E's previous inspection revealed only wet spot. State and NAP personnel observed situation evening of 6/29 and today. Three small seeps also observed along downstream toe. Dam's downstream slope quite steep and heavily wooded. Inspection on 6/30 indicated leakage increasing.

i. Description of Danger Involved: Although dam located in rural area, downstream flooding would endanger sportmen and cause some damage to 10-20 homes within possible flood plain.

j. Recommendations Giver to Governor: Immediate drawdown of pool behind dam. (NAP and State personnel agree that lowering of the pool by carefully breaching masonry (stonewall with concrete cap) spillway. Prior to breaching spillway State and CE personnel, assisted by local police, will check downstream to determine areas that breach water may pose a hazard).

k. Urgency Category: Emergency

l. Emergency Actions Taken: State notified owner of problem - 6/30. Owner's representative and his contractor met with State at 1400 hours, 30 June 78 at site, to determine remedial action(s). As previously noted, local police and CE personnel will check downstream areas before and after breach is made. State desires impoundment release as soon as possible.

m. Remarks: Awaiting results of State/Owner 1400 hour meeting, this date.

W.H. ZINK
Coordinator, Dam Inspection Program
USAED, Philadelphia
1515 hrs, 30 June 1978

UNSAFE DAM

NATIONAL PROGRAM OF INSPECTION OF DAMS

SECOND REPORT

a. Name: Untermeyer Dam

b. Type: Combination - Earth and Stonewall c. Height: 18+ feet d. Id. No.: NJ00253

e. Location

State: New Jersey County: Morris

Nearest D/S City, Town, or Village: Pequannock

River or Stream: East Ditch

f. Owner: Brooks-Podesta Trust, P.O. Box AK, Montclair, NJ 07042

g. Date Governor Notified of Unsafe Condition: 30 June 1978

h. Condition of Dam Resulting in Unsafe Assessment: Unchanged. See Report No. 1, dated 30 June 1978.

i. Description of Danger Involved: Unchanged. See Report No. 1, dated 30 June 1978.

j. Recommendations Given to Governor: Unchanged. See Report No. 1, dated 30 June 1978.

k. Urgency Catergory: Emergency

l. Emergency Actions Taken: Drawdown of pool behind dam started about 1800 hours, 30 June 1978. Drawdown accomplished by cutting 4-foot wide by 18-inch deep notch in masonry spillway. Although downstream floor appreciably increased, no flooding occurred as a result of breach. Inspection by State and Corps on 1 July revealed lake down 0.5-feet and leakage abated. However, due to soft, wet embankment it was considered prudent to increase notch to depth of 4-feet. This drawdown of 4-feet considered sufficient to alleviate emergency condition.

W. H. ZINK
Coordinator, Dam Inspection Program
USAED, Philadelphia
1000 hrs, 3 July 1978

UNSAFE DAM

NATIONAL PROGRAM OF INSPECTION OF DAMS

THIRD AND FINAL REPORT

a. Name: Untermeyer Dam

b. Type: Combination - Earth and stonewall c. Height: 18+ feet d. Id. No: NJ00253

e. Location

State: New Jersey County: Morris

Nearest D/S City, Town or Village: Pequannock

River or Stream: East Ditch

f. Owner: Brooks-Podesta Trust, P.O. Box AK, Montclair, NJ 07042

g. Date Governor Notified of Unsafe Condition: 30 June 1978

h. Condition of Dam Resulting in Unsafe Assessment: Unchanged. See Report No. 1, dated 30 June 1978.

i. Description of Danger Involved: Unchanged. See Report No. 1, dated 30 June 1978.

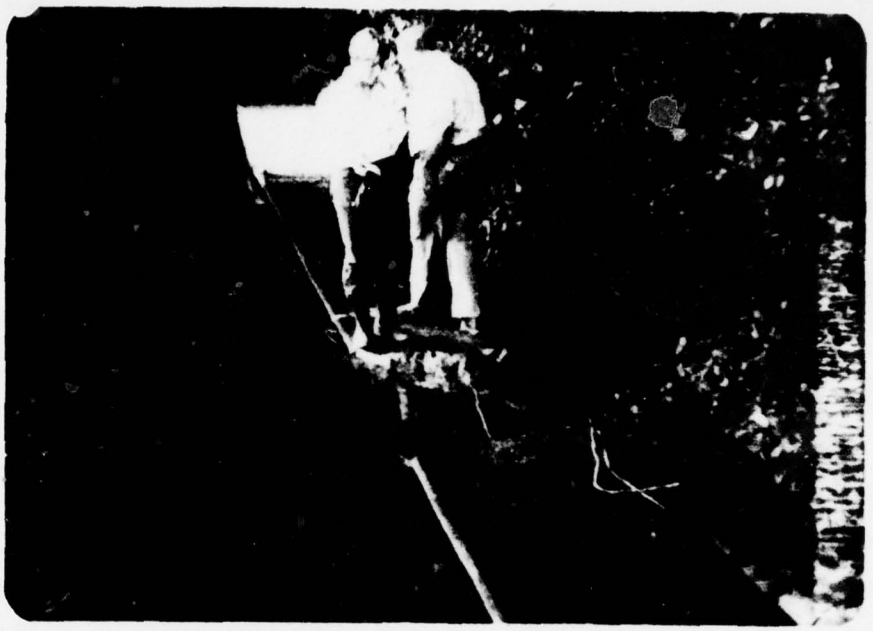
j. Recommendations Given to Governor: Unchanged. See Report No. 1, dated 30 June 1978.

k. Urgency Category: Non-Emergency

l. Emergency Actions Taken: Notch (4-feet wide x 4-feet deep) cut into masonry (stonewall) spillway. Work initiated on 30 June 1978 and completed, with lake drawdown of 4-feet, on 6 July 1978. With drawdown completed, the "Emergency" condition has passed and the condition is now considered "Non-emergency."

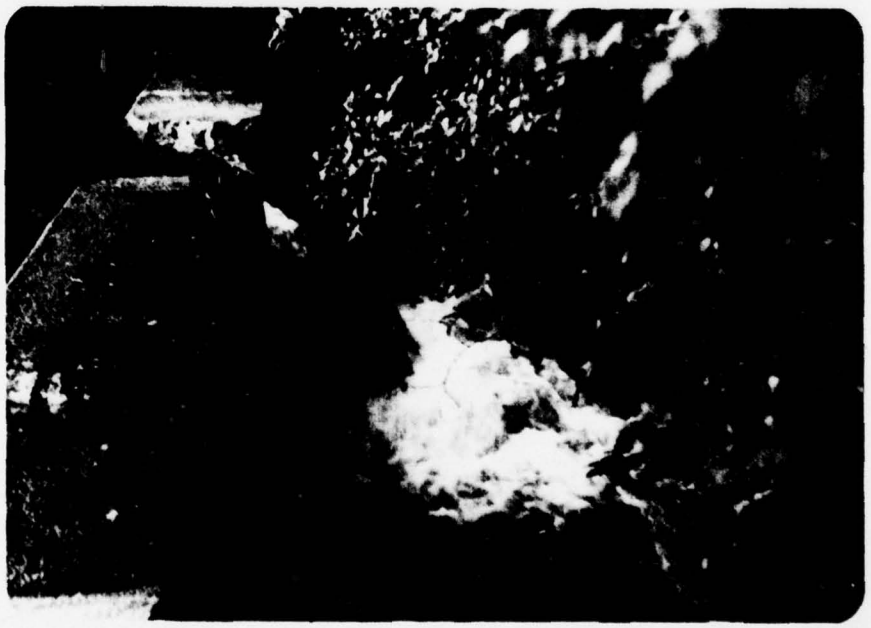
m. Remarks: No more reports will be issued unless there is change in the present conditions.

W. H. ZINK
Coordinator, Dam Inspection Program
1430 hrs, 6 July 1978



30 June 78 (Evening)

NJDEP personnel atop masonry spillway, beside partially deepened notch (18-inches) in the spillway wall of UNTERMEYER Dam. (Notch later extended to depth of 4-feet from top of spillway.)



30 June 78 (Evening)

Lake water exiting through partially deepened notch in masonry spillway of UNTERMEYER Dam.

PHASE 1 REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam:	UNTERMEYER DAM
ID Numbers	N.J. No. 22-5 Fed ID NJ00253
State Located:	New Jersey
County Located:	Morris
Stream:	East Ditch
River Basin:	Passaic
Date of Inspections:	8,12,29 June, and 3 and 6 July 1978

ASSESSMENT OF GENERAL CONDITIONS

Untermeyer Dam was found to be unsafe on 29 June 1978 because of a leak observed in the downstream face of the earth embankment. The owner was directed by NJ DEP to lower thelevel of the lake. Lowering of the lake was started on 30 June by means of a 4-ft-deep notch cut below the top of the spillway. By 6 July 1978 the Lake had lowered to the bottom of the notch.

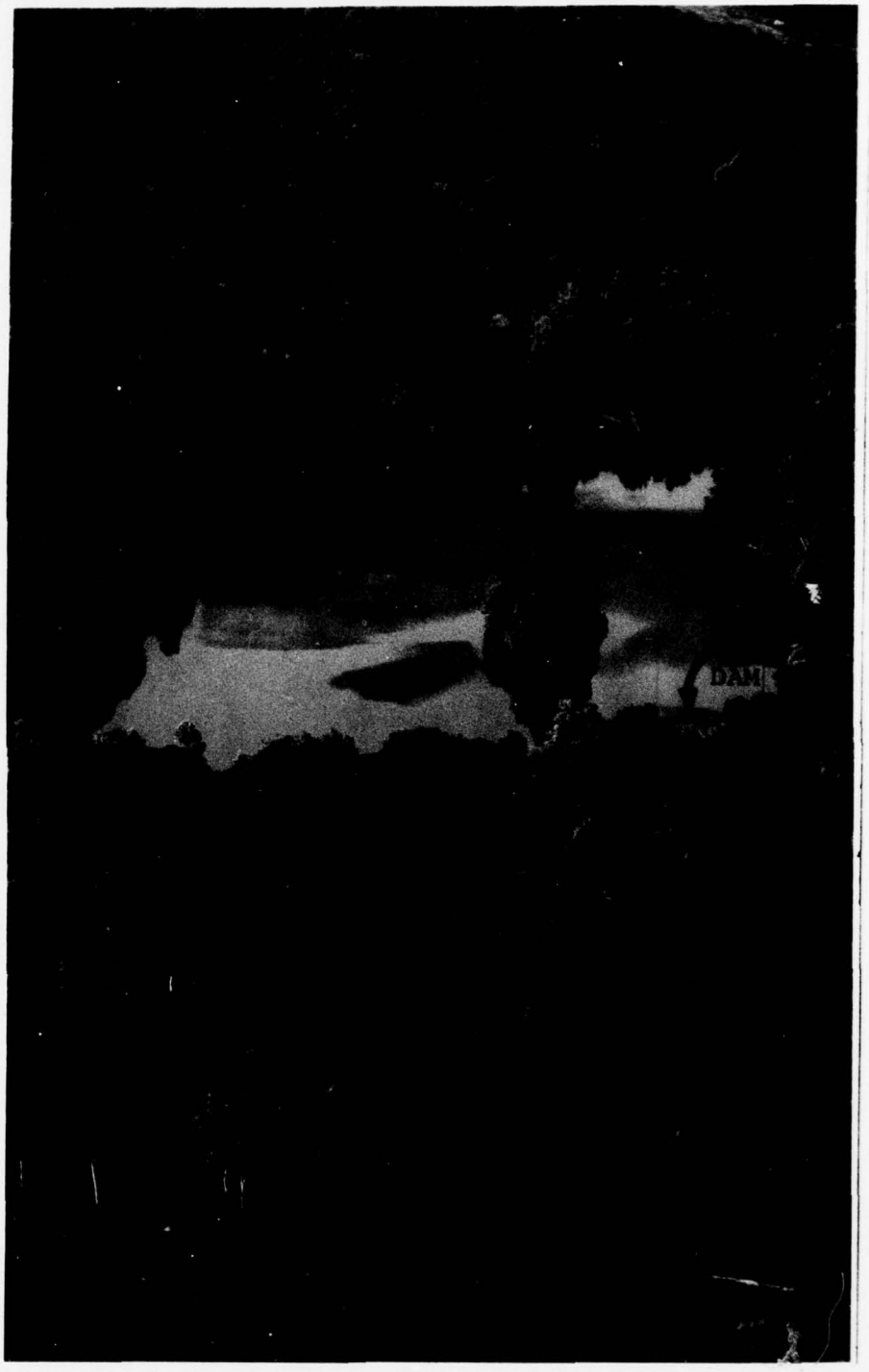
The embankment and spillway are in poor condition and considered unacceptable as determined by CE screening criteria for impoundment of Untermeyer Lake. Although the lake level has been lowered there is insufficient spillway capacity to handle the 1/2 PMF. We estimate

the dam can adequately pass only 20% of the PMF. The trees should be removed from the crest and downstream slope of the embankment. The embankment, abutment, and foundation materials should be investigated. This investigation would provide information for use in designing upstream and downstream, and, if necessary underseepage, remedial measures. The determination of the additional embankment height that could be constructed to obtain additional storage capacity would also be made using this information. Piezometers should be installed in the upstream and downstream cross section of the embankment at the marshy area of the old river channel. If necessary, relief wells should be installed at the downstream toe. A gated spillway should be constructed and a bottom outlet provided for controlled drawdown of the pond in the event of an emergency. An accurate topographic survey should be made with the lake at its lowered elevation. The survey results would be used in making drawdown analyses.

The spillway capacity is seriously inadequate. The actual capacity of the spillway should be determined using more precise and sophisticated methods and procedures. The need for and type of mitigating measures should be determined. Around the clock surveillance during periods of unusually heavy precipitation should be provided, and a warning system established.

Dennis J. Leary

Dennis J. Leary, P.E.



OVER VIEW

UNTERMEYER DAM

21 June 1978

PHASE 1 REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam:	UNTERMEYER DAM
ID Numbers	N.J. No. 22-5 Fed ID No. NJ00253
State Located:	New Jersey
County Located:	Morris
Stream:	East Ditch
River Basin:	Passaic
Date of Inspections:	8,12,29 June, and 3 and 6 July 1978

LANGAN ENGINEERING ASSOCIATES, INC.

Consulting Civil Engineers

CONTENTS

PHASE 1 INSPECTION REPORT

NATIONAL DAM SAFETY REPORT

UNTERMEYER DAM FED ID NO. NJ00253 N.J. No. 22-5

SECTION 1 PROJECT INFORMATION

1.1 General

Authority to perform the Phase I safety inspection of Untermeyer Dam was received from the State of New Jersey, Department of Environmental Protection, Division of Water Resources by letter dated 26 May 1978. This Authority was given pursuant to the National Dam Inspection Act, Public Law 92-367.

The purpose of the Phase I investigation is to develop an assessment of the general conditions with respect to safety of Untermeyer Dam and appurtenances based upon available data and visual inspection, and, determine any need for emergency measures and conclude if additional studies, investigations and analyses are necessary and warranted. The assessment has been made using screening criteria established in Recommended Guidelines for Safety Inspection of Dams prepared by the Department of Army, Office of the Chief of Engineers. It is not the purpose of the inspection to imply that a dam meeting or failing to meet the screening criteria, is per se, certainly adequate or inadequate.

1.2 Project Description

Untermeyer Dam consists of a 23- ft-high, 300-ft-long earth embankment and a 7-ft-high, 40-ft-long masonry rock spillway section. It is reported to have been constructed in 1915. It is located in Morris County, Kinnelon, New Jersey, at 40° 58' 15" latitude and 74° 24' 48" longitude. A regional vicinity map is given in Fig. 1.

The dam outlet is a free-fall spillway which is located about 500 ft upstream of Sawmill Pond. The spillway weir is 40-ft-long, 3.3 ft-wide, and 1.5 ft below the crest of the dam.

The original purpose of the lake appears to have been recreation, however, the lake does not have any present purpose.

Untermeyer Lake Dam is classified as being "Small" on the basis of its reservoir storage volume, which is more than 50-acre feet, but less than 1,000-acre feet. It is also classified as "Small" on the basis of its total height, which is less than 40 feet.

In the National Inventory of Dams, Untermeyer Lake Dam has been classified as having "High Hazard Potential" on the basis that failure of the dam would cause excessive property damage to residences downstream, and could potentially cause more than a few deaths. Visual inspection of the downstream area shows that breach of the dam would cause little damage to residences which are located on high ground but could be hazardous to people hunting or using Sawmill Pond for recreation. Accordingly, it is proposed to change the Hazard Classification Potential to "Significant".

The dam and appurtenances and the Lake are private property. They are owned by P.B. Brooks and J.F. Podesta, P.O. Box AK, Montclair, N.J. 07042.

The owners were not able to provide any information relative to design, construction, maintenance or operation. There is a complete lack of information and the only data available originated from visual inspection and map and air photo examination.

1.3 Pertinent Data

The reservoir area is 16 acres and the watershed area is approximately 300 acres. The drainage basin is undeveloped woodlands with the exception of a large residence located near the lake. The ground surface slopes of the watershed vary from 10 to 25%.

Elevations and distances have been established by means of surveyors transit and rod and elevations obtained from U.S.G.S. Pompton Plains Quadrangle, 7.5 minute Series Topographic Map. They are approximate.

The spillway is constructed of rock masonry with mortar and has a 1.3-ft-thick concrete cap. It is located on the left side of the embankment and founded

on rock. It is extended to the left bank by a short concrete abutment. The spillway is not located in the old river bed. The outlet channel of the spillway is steep with an average slope of 25% for about 100 ft where it reaches the stream bed (East Ditch). The outlet channel is on a natural rock surface between the spillway and the stream bed which provides for efficient dissipation of energy.

The elevation of the top of the spillway abutments is 618. The crest of the spillway is 3.3 ft wide and at el 616.5.

The embankment-spillway abutment appears to be on rock. The earth embankment starting from the right abutment crosses the old river bed and the foundation is presumed to be glacial till. The original crest elevation appears to have been about the same as the spillway abutment elevation and has since been lowered by erosion and possibly overtopping. In some places it is only 8 to 10 inches above the crest of the spillway.

There are no provisions to lower the lake water level. A 3.5-ft-wide, 4-ft-deep notch has been cut below the crest of the spillway. The essential project features are shown in Fig. 2.

SECTION 2 ENGINEERING DATA

No engineering data or records were available. We were told by Mr. Tom Hup, the caretaker who lives at the lake that the water level is never higher than the level we observed during our initial visual inspection one inch above the spillway crest. This does not appear credible. The crest width of the embankment was at one time probably at least 5 or 6 ft, but has been eroded on the downstream side. This indicates probable past overtopping.

The upstream slope at the top of the dam is relatively flat and steepens to about 2.5 hor to 1 vert toward the lake. It has been paved with placed rock. The downstream slope appears to have eroded and is approximately 1.5 hor to 1 vert.

2.1 Regional Geology

Untermeyer Lake Dam is located in the New Jersey Highlands physiographic province. The New Jersey Highlands extend across the State in a northeast-southwest direction from the border of New York to the Delaware River and includes the northwest portions of Hunterdon, Passaic, and Morris counties and the southeastern parts of Warren and Sussex Counties. This province is part of the New England Physiographic Province and lies between the Appalacian Ridge and Valley Province to the northwest and the Piedmont Province to the southeast, see Fig. 3.

The Highlands are characterized by rounded and flat-topped northeast-southwest ridges and mountains up to 1,400 ft high separated by narrow valleys. The orientation of the valleys are usually, but not always controlled by the underlying geologic structure.

Bedrock of the region is predominently Precambrian gneisses, schists, and metasediments. Some sedimentary strata, typically sandstones, shales and conglomenate have been infolded and infaulted into the valley bottoms.

The regional geologic structure reflects the very old age of bedrock. A number of regional faults cross the area in a northeast southwest direction, including the Ramapo Fault; the more than 30 mile long fault scarp forms the eastern border of the province. Faults control many of the river valley orientations. The relatively uniform slope of the mountain elevations, from northwest to southeast, is a direct result of the faulting. The entire area is part of the now dissected Schooley Peneplain.

The Pleistocene Age Wisconsin glacier covered all of the dam site area.

The glacier stripped most of the existing overburden and weathered rock and uncovered the numerous hard bedrock knobs and ridges seen throughout the province. Most of the side-slopes in the area are covered with heavy boulder tills (ground moraine), whereas glacial outwash and recent alluvium cover the valleys.

2.2 Site Geology

Untermeyer Dam is located just west of the Ramapo Fault scarp near the eastern edge of the Highlands. On the right abutment the topography rises steeply to approximately 900 ft while on the left abutment the mountain top approaches 800 ft. The dam is at approximately el 618.

This dam was constructed in a stream valley which contained a large bare knob of bedrock in the approximate center of the valley. The spillway was constructed on the bedrock knob and what appears to be a random fill embankment was constructed between the spillway and the right abutment to the south. Boulders up to 3 ft in diameter were observed in the embankment. The original stream bed is located approximately half-way between the spillway and the right abutment. It appears that while the spillway has been constructed on rock, the major portion of the embankment has been built on ground moraine and alluvium. Rounded boulders up to 12 ft in diameter were seen in the old stream bed.

The right abutment of the embankment appears to be tied into a boulder and cobble till. Most of the rock is very angular. However, no evidence of a quarry or mine could be found on the air photos or on the ground. Bedrock is exposed further up the abutment.

The bedrock upon which the spillway is constructed extends downstream for a considerable distance and forms a bare knob north of the spillway. Bedrock appears to be a granite or granite gneiss.

The rock is medium grained and the gneissic banding is not distinct. Joints in the bedrock are random and probably due to the lack of a well developed foliation.

North of the bedrock knob, the ground level is relatively flat. This area is probably glacial till which has been reworked and leveled.

Our interpretation of geologic conditions at the dam site is given in Fig 4.

SECTION 3 VISUAL INSPECTION

This section is separated into three parts. The first part (8 and 12 June) gives the observations made during those site visits; the second part (29 June) gives the observed leakage condition that did not exist during the 8 and 12 June visits; and the third part (6 July) gives the conditions observed during and at the conclusion of the draw down of the lake. The visual inspection check list is given in Appendix 1 and photographs are given in Appendix 2.

3.1 8 and 12 June

In addition to the description of the dam which was obtained from visual inspection on 8 and 12 June 1978 the following observations have been made:

The spillway masonry is in good condition. The right side wall of the spillway needs repair. Some stones have fallen down from the upper part, and leaks, approximately 1 gpm exist in this area. The left abutment is on rock and in better condition with minor leakage, approximately 1/16 gpm.

The embankment is planted with trees. Not only are there trees on the downstream face but some are planted upstream of the crest center line and the roots cross the crest in the upstream-downstream direction. These tree roots appear to be holding the 2 to 3 ft wide crest together.

The downstream slope and crest have been eroded, probably by weathering, wearing of the foot path along the crest, and overtopping. As a consequence, on several cross sections there is only a few inches of soil above the spillway crest level. The foot path is at or slightly below lake water level at some locations. Erosion has also occurred at the right spillway abutment. There is leakage and a marshy area at the downstream toe of the embankment in the area that appears to be the old river bed. The leakage is small and appears to be approximately 1/8 gpm.

There are no traces of displacement of the embankment.

3.2 29 June

On 29 June a leak was observed on the downstream face of the earth embankment. Leakage was occuring at about 15 gpm from a single source located 4 ft below the crest and 110 ft from the spillway. The water was clear. In addition, the downstream face of the embankment in the area of the leak was wet and spongy. Mr. W. Rogers of the N.J. D.E.P. Division of Water Resources, Bureau of Flood Plain Management was informed of the conditions and their critical nature with respect to the stability of the embankment. Subsequent inspection and action were taken by the D.E.P., Corps of Engineers, and the Owner. Sketches showing the observed conditions are included in Appendix 3. Lowering of the lake was started about 6 p.m. on 30 June and the leak in the embankment had stopped when the lake water level had lowered about six inches.

3.3 6 July

By 6 July, a 3.5-ft-wide, 3.8 to 4.0-ft-deep section of the spillway had been removed and the lake level had lowered 3.8 ft to the level of the opening in the spillway.

No discharge was occuring at the location of the leak or at other locations on the downstream face of the earth embankment.

The lowered lake level revealed placed rock riprap on the upstream slope of the embankment. The riprap appeared to be in good condition.

SECTION 4 OPERATION PROCEDURES

There are no operation procedures. It is not possible to lower the water level in case of emergency because there is no bottom outlet. It was therefore necessary to remove a section of the spillway to lower the lake level.

SECTION 5 HYDRAULIC/HYDROLOGIC

The hydraulic/hydrologic evaluation is based on a spillway design flood (SDF) equal to one half of the full probable maximum flood (1/2 PMF) in accordance with the evaluation guidelines for dams classified as significant hazard and small in size. The original design data for this dam is not available. The PMF has been determined by developing a synthetic hydrograph based on the maximum probable precipitation of 22.5 inches (200 square mile - 24 hour) Hydrologic Computations are presented in Appendix 4. The 1/2 PMF determined for the subject watershed is 890 cfs.

The main spillway is essentially a broad crested weir with a length of 40 ft and a maximum depth of 1.5 ft. The maximum capacity of the spillway (with the notch) is 330 cfs which is less than the SDF.

The top of the dam elevations are such that most of the top of the embankment is lower than the top of the spillway. Therefore, the spillway cannot flow to its full capacity without the embankment first overtopping. The maximum depth of flow on the spillway flange as controlled by the lowest dam crest elevation is only 0.7 ft. The capacity for this depth is only 182 cfs or approximately 50% of its capacity.

As stated earlier, a 3.5-ft-wide by 3.8 to 4.0-ft-deep notch has been cut in the spillway to affect drawdown of the lake. Flood routing calculations made for the 1/2 PMF with the lowered lake level and new notch result in overtopping of the dam as well as the spillway. With existing spillway conditions the dam will overtop by approximately 1.1 ft under the 1/2 PMF. We estimate that the dam can adequately pass 20% of the PMF. It is also concluded that the dam and spillway would overtop if the notch were not present and the lake level was initially at the original spillway crest.

No drawdown analysis has been made since no outlet works exist.

SECTION 6 STRUCTURAL STABILITY

The structural stability of the spillway was initially found to be adequate. However, the stability of the embankment was found to be critical because of the potential for piping along tree roots, erosion when trees are blown down by a storm, degradation and regressive erosion of what is left of the embankment crest, and overtopping. This condition was confirmed by the piping that was observed on 29 June. The observed piping indicates that such a condition was imminent and undetectable by means of visual observation. The leak occured when the water level was slightly lower than at the time of our earlier visits and there were no storms between visits.

Untermeyer Lake Dam is located in Seismic Zone 1 of the Seismic Zone Map of Contiguous States. The static stability of the embankment is critical. Therefore the embankment is considered to be unstable under earthquake loading.

SECTION 7 ASSESSMENT, RECOMMENDATIONS/REMEDIAL MEASURES

7.1 Assessment

The embankment and spillway are in poor condition and considered unacceptable as determined by CE screening criteria for impoundment of Untermeyer Lake. Although the lake level has been lowered there is insufficient spillway capacity to handle the 1/2 PMF. We estimate the dam can adequately pass only 20% of the PMF.

7.2 Recommendations/Remedial Measures

We recommend the following measures be taken:

1. Remove the trees from the crest and downstream slope of the embankment. This should be done very soon.

2. Investigate the embankment, abutment, and foundation materials. This investigation would provide information for use in designing upstream and downstream, and, if necessary underseepage, remedial measures. The determination of the additional embankment height that could be constructed to obtain additional storage capacity would also be made using this information. This should be done soon.

3. Install piezometers in the upstream and downstream cross section of the embankment at the marshy area of the old river channel. If necessary, relief wells should be installed at the downstream toe. This should be done very soon.

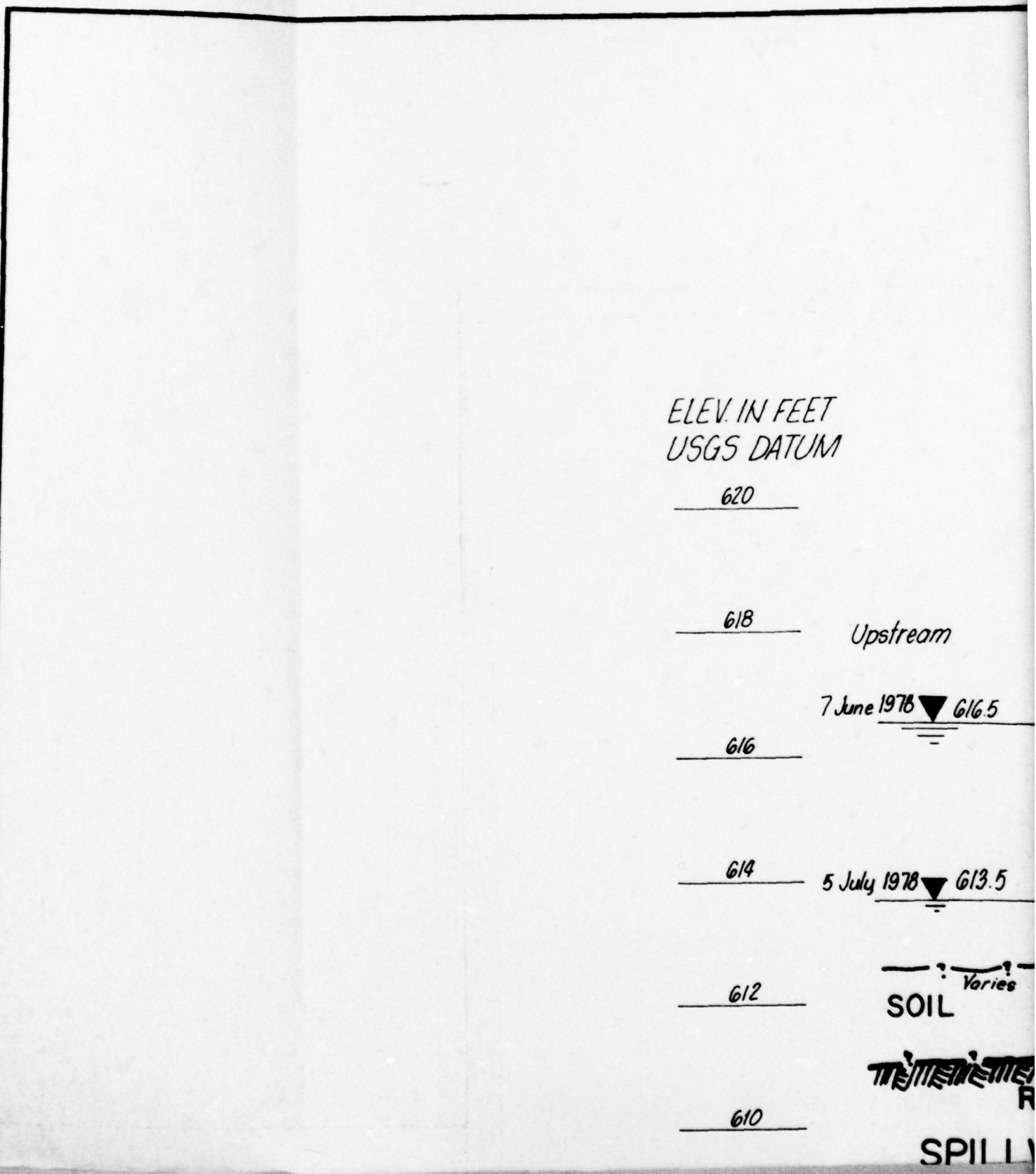
4. A gated spillway should be constructed and a bottom outlet provided for controlled drawdown of the pond in the event of an emergency. This should be done in the future.

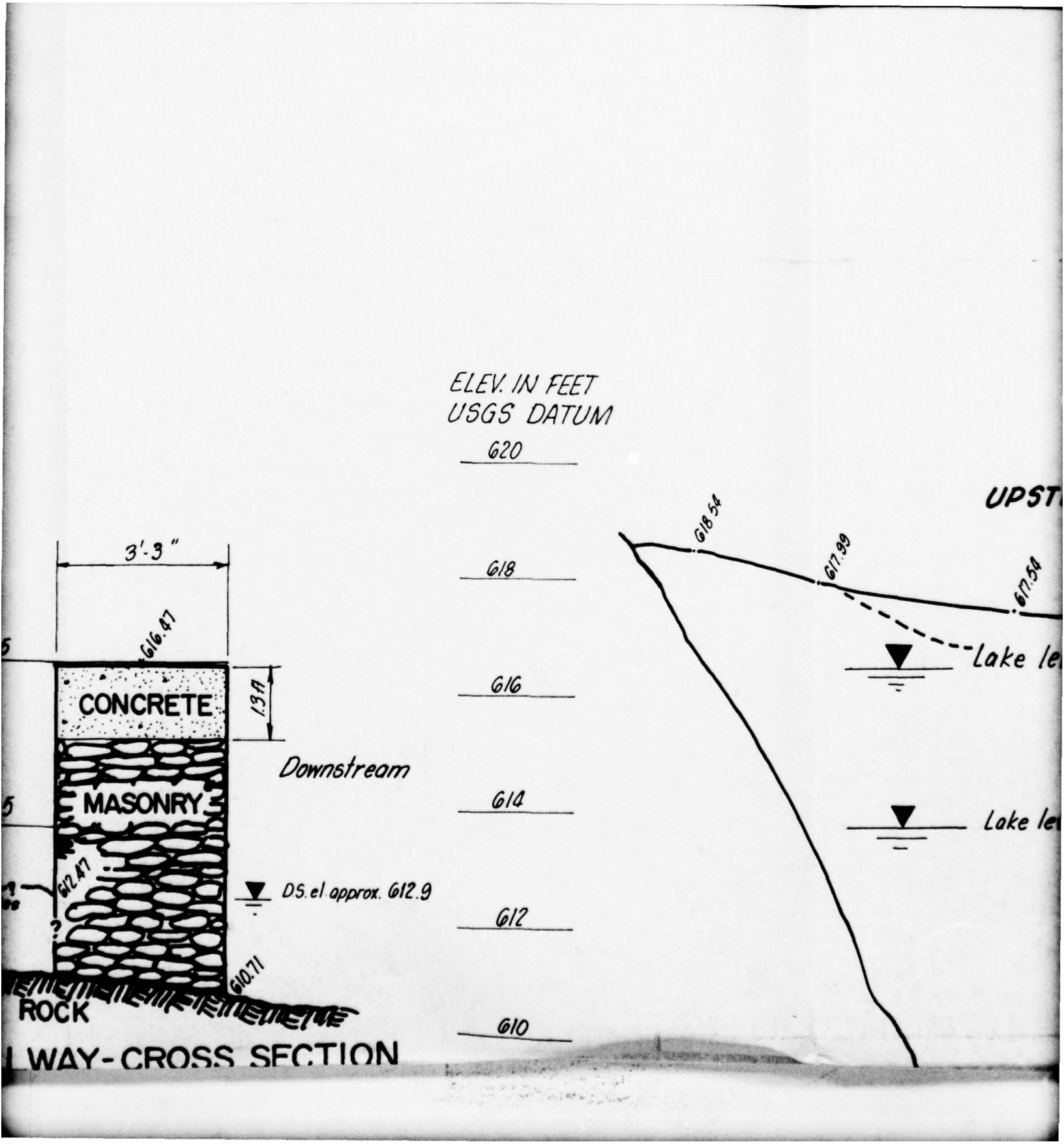
5. An accurate topographic survey should be made with the lake at its lowered elevation. The survey results would be used in making the drawdown analyses. This should be done soon.

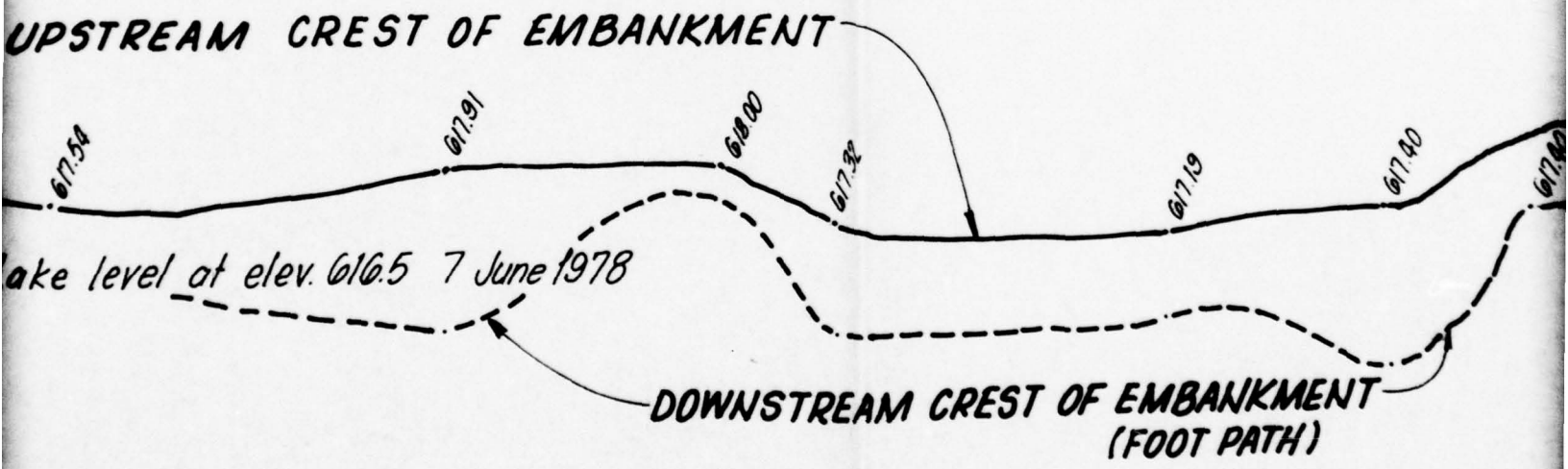
6. The spillway capacity is seriously inadequate. We estimate the dam can adequately pass only 20% of the PMF. The actual capacity of the spillway should be determined using more precise and sophisticated methods and procedures. The need for and type of mitigating measures should be determined. Around the clock surveillance during periods of unusally heavy precipitation should be provided, and a warning system established. This should be done in the near future.

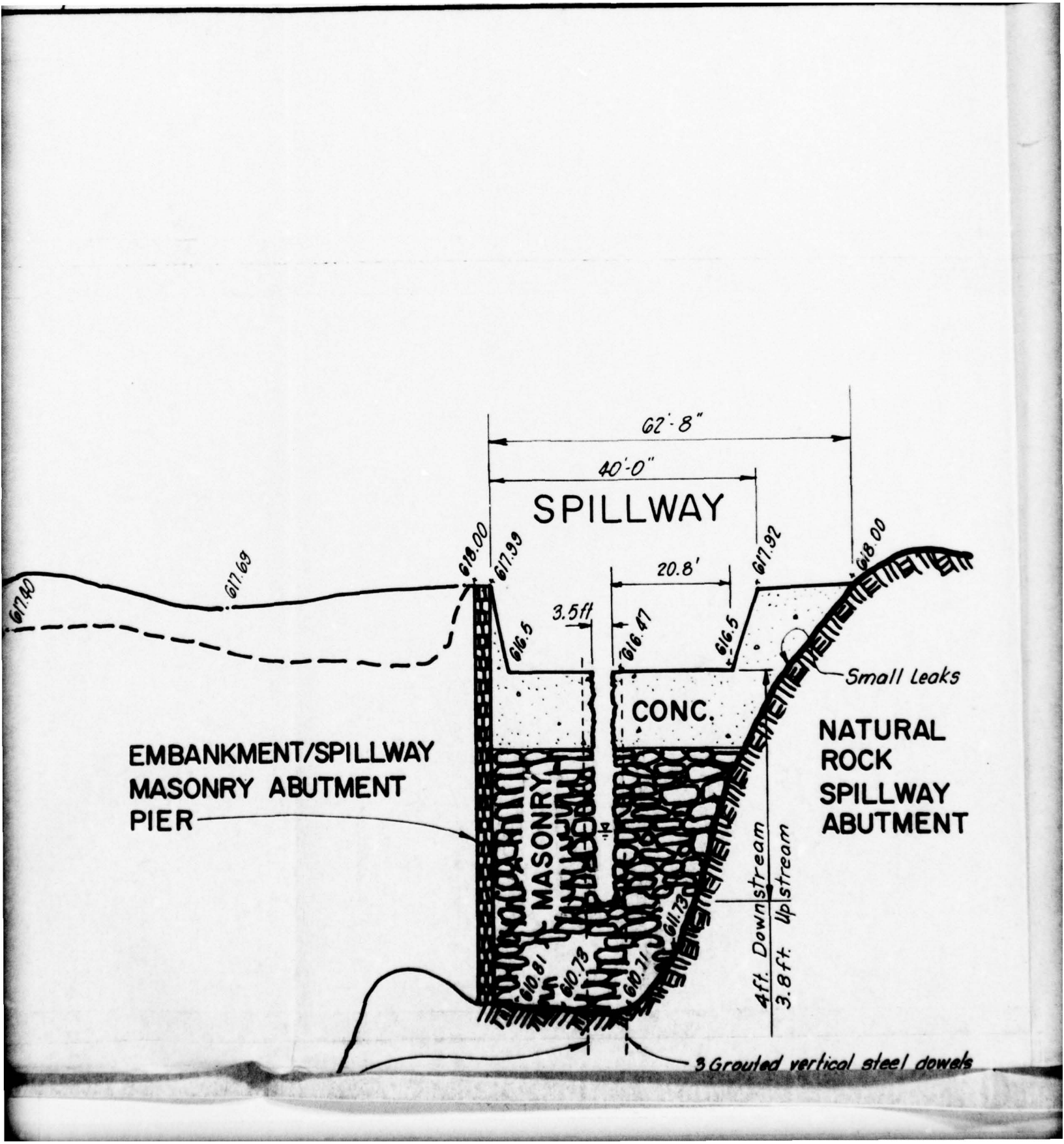
REGIONAL VICINITY MAP
UNTERMEYER DAM

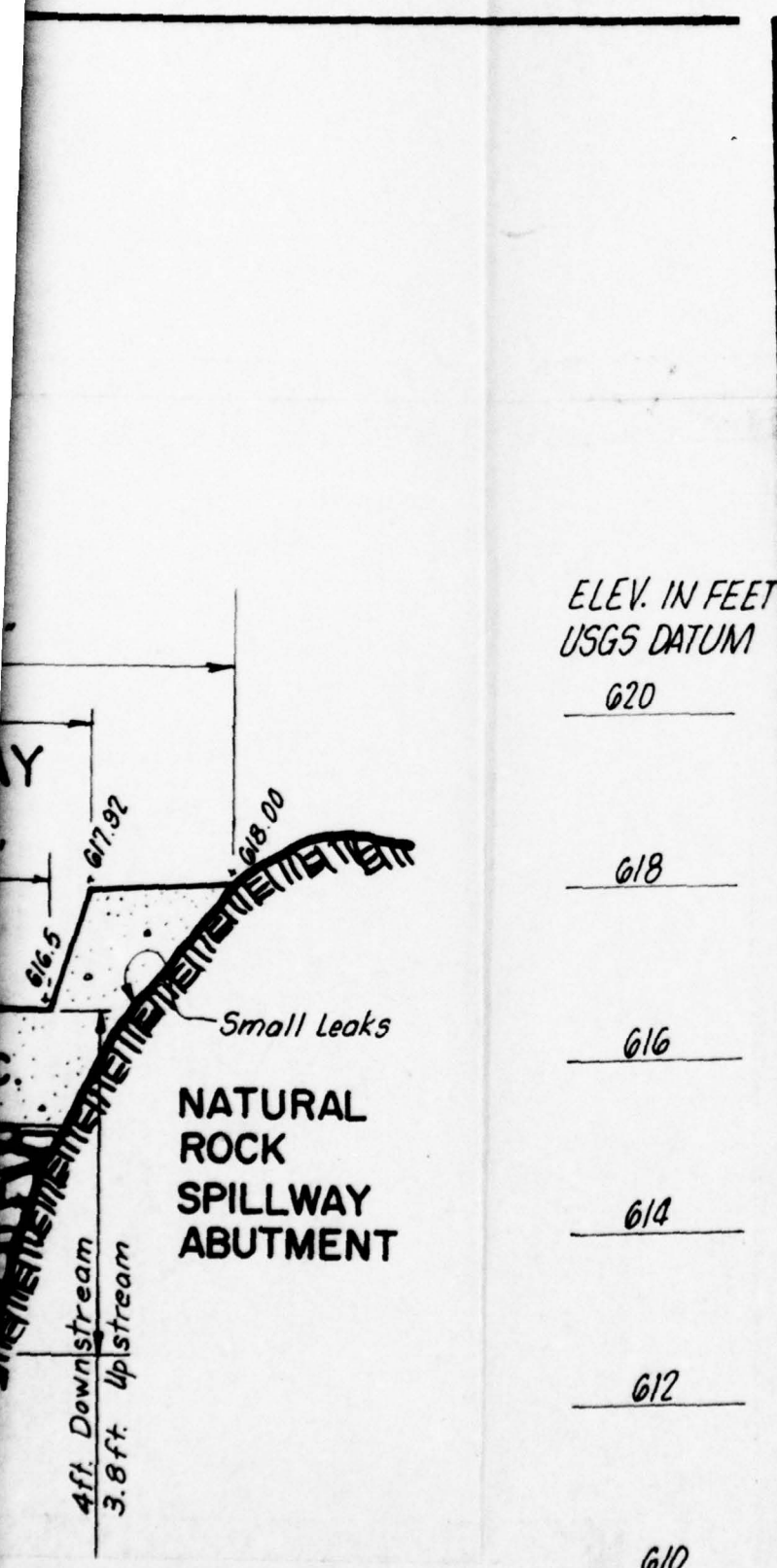
Fig 1


ELEV. IN FEET
USGS DATUM
620
618
Upstream
7 June 1978
616.5
616
614
5 July 1978
613.5
612
Varies
SOIL
610
SPILL


ELEV. IN FEET
USGS DATUM
620
618
616
614
612
610
3'-3"
616.47
CONCRETE
1.31
MASONRY
612.47
DS. el approx. 612.9
610.71
ROCK
Downstream
UPST
618.54
617.99
617.54
Lake le
Lake le
WAY-CROSS SECTION


UPSTREAM CREST OF EMBANKMENT
617.54
617.91
618.00
617.32
617.19
617.40
617.40
Lake level at elev. 616.5 7 June 1978
DOWNSTREAM CREST OF EMBANKMENT
(FOOT PATH)
Lake level at elev. 613.5 5 July 1978


62'-8"
40'-0"
SPILLWAY
618.00
617.99
617.92
618.00
617.69
617.40
20.8'
3.5ft
616.5
616.47
616.5
Small Leaks
CONC.
EMBANKMENT/SPILLWAY
MASONRY ABUTMENT
PIER
NATURAL
ROCK
SPILLWAY
ABUTMENT
MASONRY
BACKFILL
610.81
610.73
610.71
611.73
4ft. Downstream
3.8ft. Upstream
3 Grouted vertical steel dowels


ELEV. IN FEET
USGS DATUM
620
618
616
614
612
610
618.00
617.92
616.5
Small Leaks
NATURAL
ROCK
SPILLWAY
ABUTMENT
4ft. Downstream
3.8ft. Upstream
Grouted vertical steel dowels

6

SECTION B-B'

ELEV. IN FEET

7

608

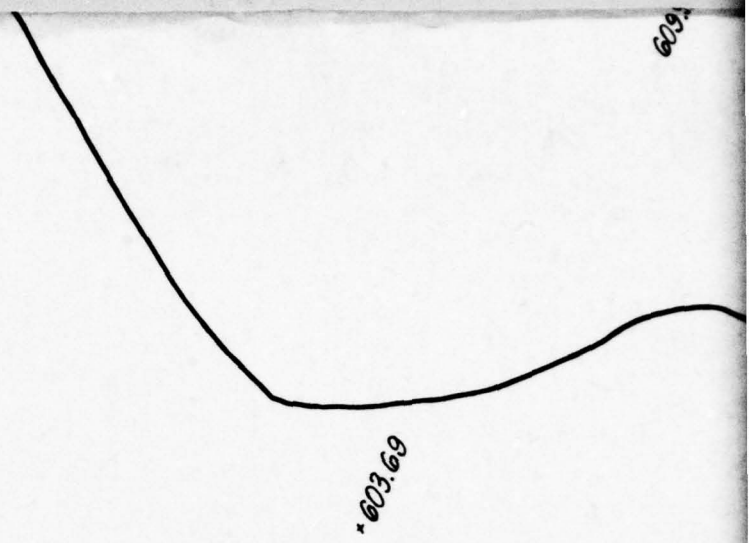
606

604

602

600

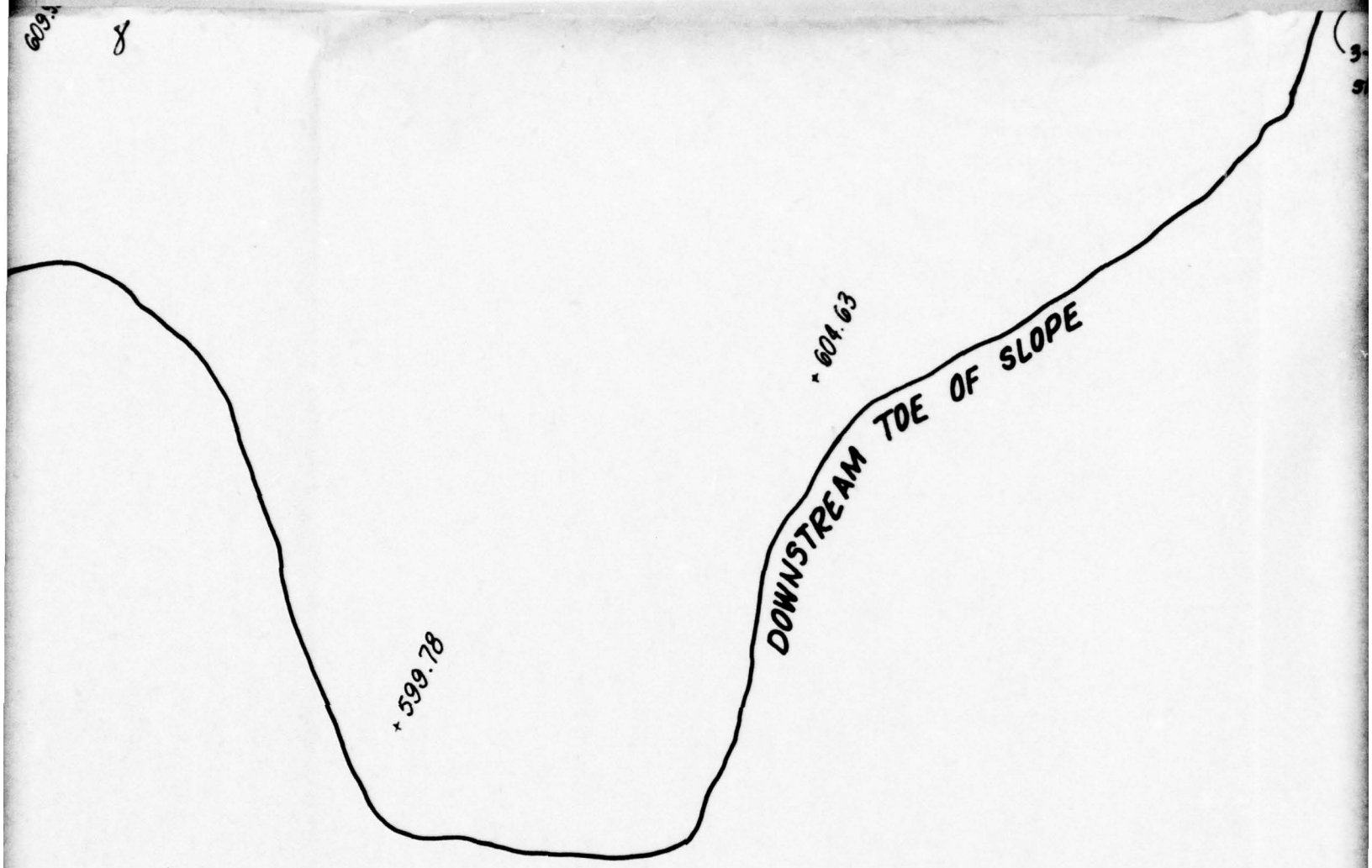
598



PROFILE ALONG CR

ELEV. IN FEET

T E



CREST OF EMBANKMENT — DOWNSTREAM ELEVA

SECTION A - A'

Horiz.: 0 10 20 30 40 50 ft

Vert.: 0 1 2 3 4 5 ft

E R M E Y E R

9/ (3-#8 Grouted vertical steel dowels

1-#8, 2-#4

608

606

604

602

600

598

ELEVATION OF SPILLWAY

8, 2#4

608

606

604

602

600

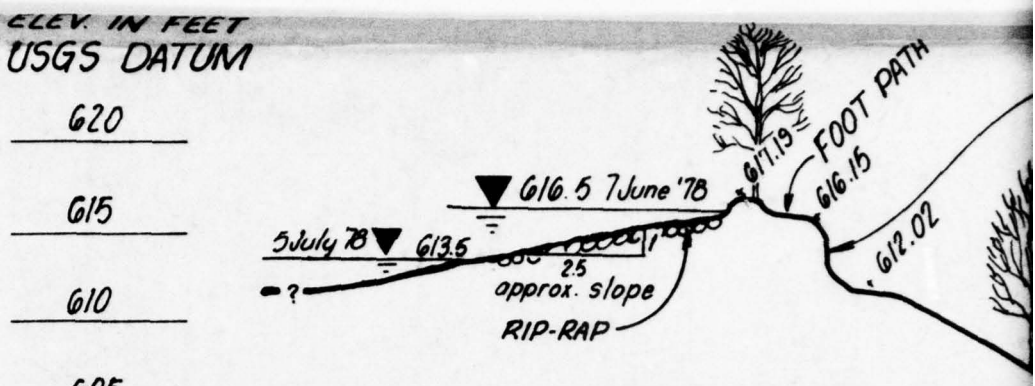
598

10

LWAY

DATE	DESCRIPTION	NO.
REVISIONS		

11

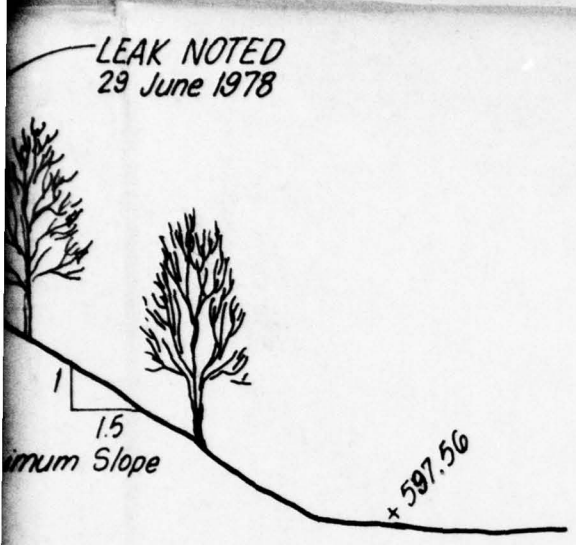


Maxim

EMBANKMENT-CRO

SECTION

0 5 10 15 20



USGS DATUM

620

615

610

605

600

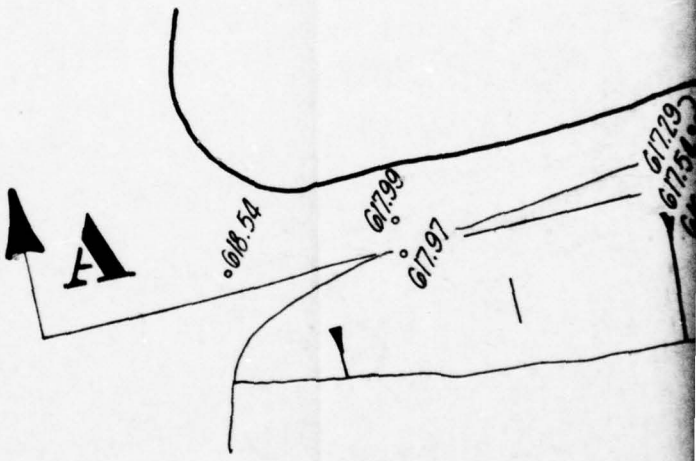
595

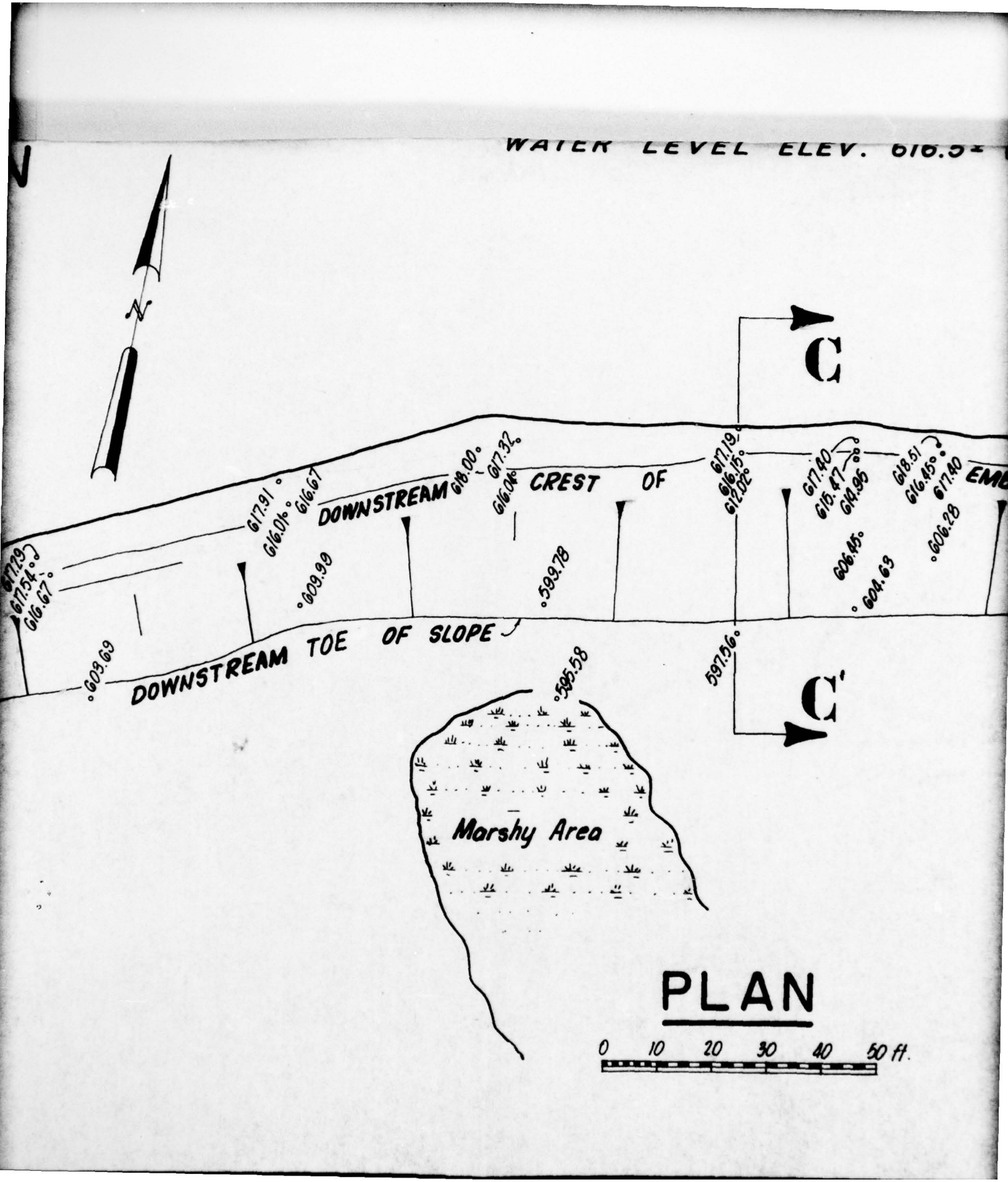
590

OSS SECTION

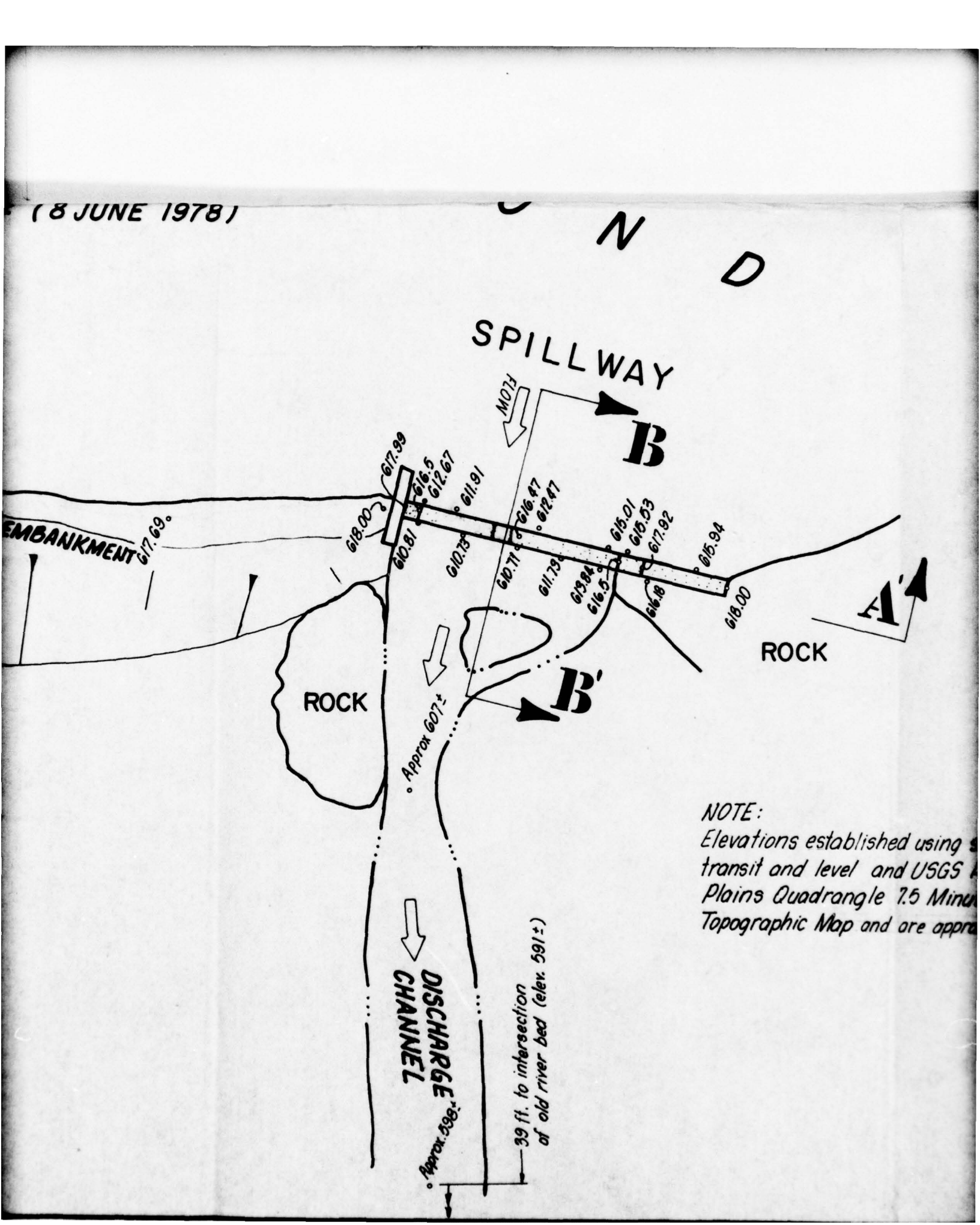
C-C'

20 25 ft




WATER LEVEL ELEV. 616.5±
N
C
C'
617.91
616.01
616.67
DOWNSTREAM
618.00
617.32
616.04
CREST OF
617.19
616.15
612.02
617.40
615.47
614.95
618.51
616.45
617.40
EME
617.29
617.54
616.67
609.99
599.78
606.45
604.63
606.28
603.69
DOWNSTREAM TOE OF SLOPE
595.58
597.56
Marshy Area
PLAN
0 10 20 30 40 50 ft.

(8 JUNE 1978)

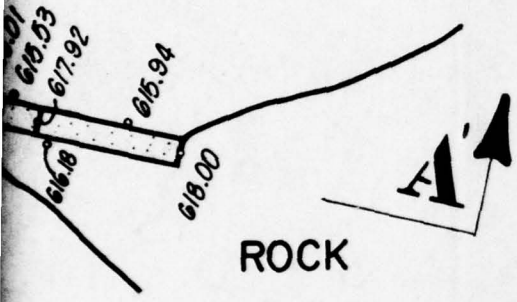


NOTE:
Elevations established using
transit and level and USGS
Plains Quadrangle 7.5 Minu
Topographic Map and are appr

D

AY

B



NOTE:
Elevations established using surveyor's transit and level and USGS Pompton Plains Quadrangle 7.5 Minute Series Topographic Map and are approximate.

LANGAN ENGINEERING

970 Clifton Avenue, Clifton, N.J.

PROJECT

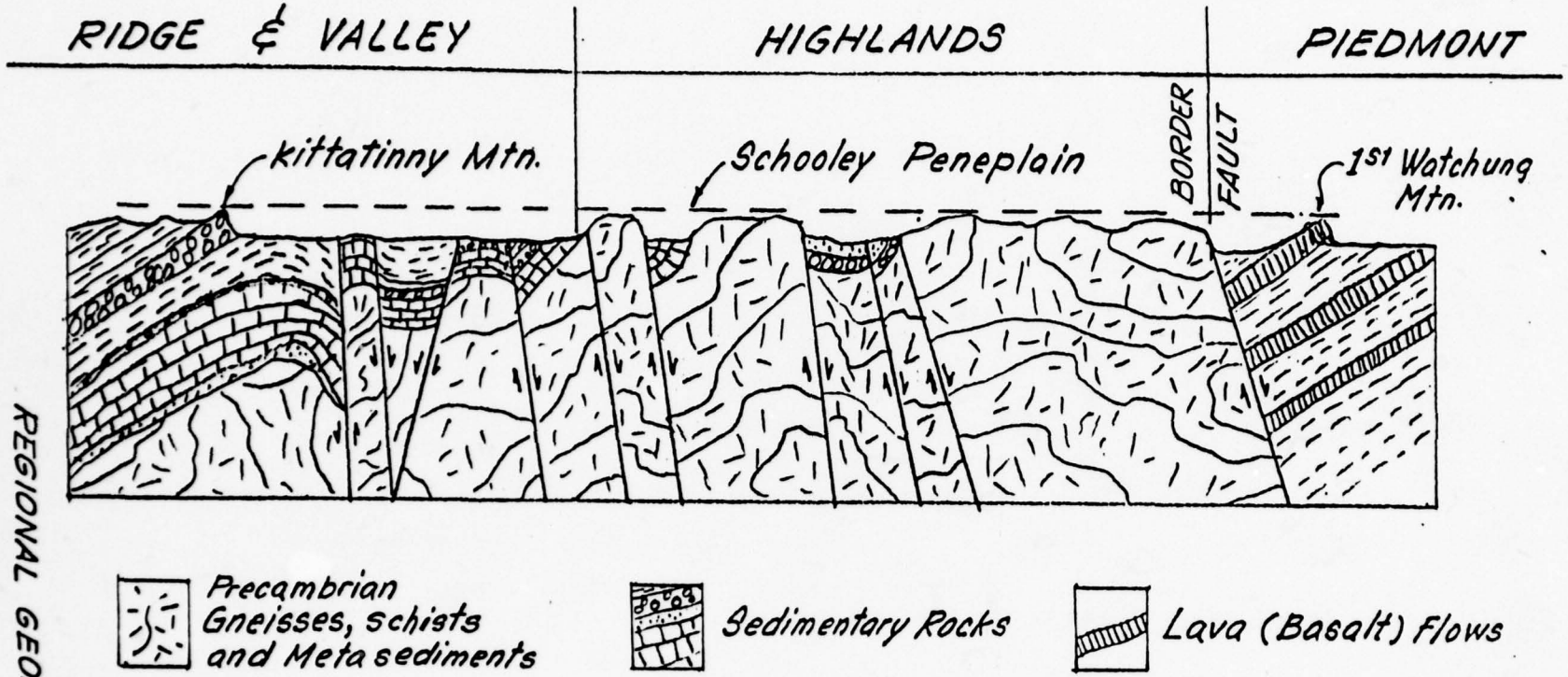
PHASE I
INSPECTION & EVALUATION of NEW JERSEY DAMS

UNTERMEYER DAM
JUNE 1978

FED. ID. No. NJ00253 N.J.No. 22-5

JOB NO.	J783
DATE	5 July 1978
SCALE	as noted
DRN. BY	JMR
CHKD. BY	DJL

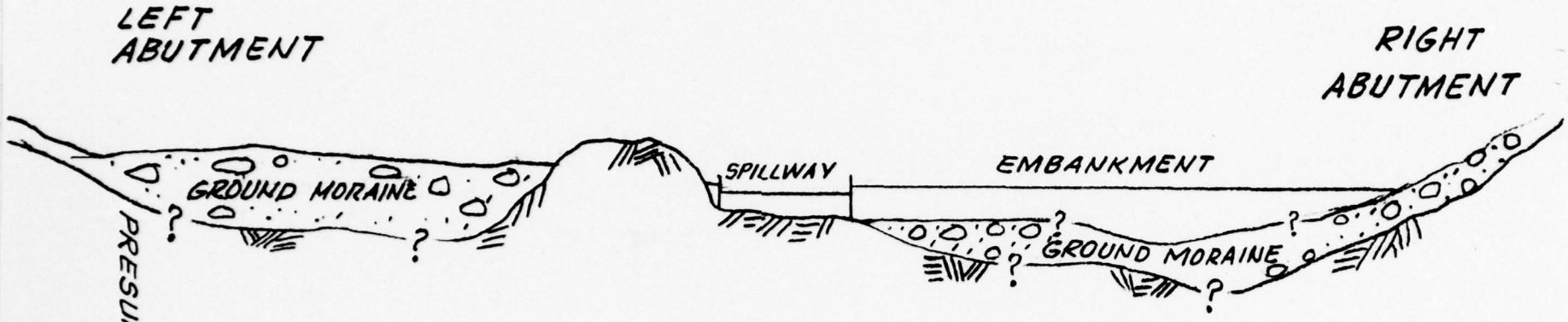
FIG. 2



REGIONAL GEOLOGIC FEATURES

Fig.3

Schematic Cross-section of New Jersey Highlands Physiographic Province (After Wolfe, 1977)



DIAGRAMMATIC SKETCH
UNTERMEYER DAM
(NO SCALE)

PRESUMED SITE GEOLOGIC FEATURES

Fig 4

APPENDIX 1

CHECK LIST

VISUAL INSPECTION

UNTERMEYER DAM

UNTERMEYER DAM

Check List
Visual Inspection
Phase 1

Name Dam Untermeyer Dam County Morris State New Jersey Coordinators NJ DEP

Date(s) Inspection 8, 12 & 29 June 1978
3 July 1978
6 July 1978
Weather Sunny Temperature 70°

Pool Elevation at Time of Inspection _____ M.S.L.
Spillway crest 8 June, el 616.5
6 July, el 612.7
Tailwater at Time of Inspection _____ M.S.L.

Inspection Personnel:

D. Leary
D. Lachel
A. Puyo
B. Langan
C. Campbell

A. Puyo Recorder

UNTERMEYER DAM

EMBANKMENT

Sheet 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	NONE OBSERVED	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	NONE OBSERVED	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Top of embankment has footpath worn below reservoir level. Downstream slope may have been to its present slope of approx. 1.5 hor to 1 vert. On the other hand it may have been constructed to this slope. Erosion has occured at embankment crest and right abutment of spillway.	Revise embankment level and widen it.
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	Appears unchanged from original alignment.	
RIPRAP FAILURES	Upstream rip rap below lake level, no apparent failures.	

UNTERMEYER DAM

Sheet 2

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
Crest and d/s slope	Trees and tree roots in crest and foot path decreases effective width of crest. D/S slope may have been eroded to steeper slope.	
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Left abutment, concrete on rock. Right abutment earth or rocky fill and/or rock. Right spillway pier and earth embankment abut.	Abutments appear satisfactory.
ANY NOTICEABLE SEEPAGE	Seepage 1/16 gpm at left abutment of spillway, 1 gpm at rt. pier and face of spillway, and 1/8 gpm at downstream of embankment.	See text for critical seepage (leak) observed on 29 June 1978.
STAFF GAGE AND RECORDER	NONE OBSERVED	
DRAINS	NONE OBSERVED	

UNTERMEYER DAM

OUTLET WORKS (SPILLWAY)

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	NONE OBSERVED	
INTAKE STRUCTURE	NONE OBSERVED	
OUTLET STRUCTURE	Free fall masonry and rock spillway with 1.3 ft thick 3.3 ft. wide cap.	
OUTLET CHANNEL	Natural rock with small falls and total drop of 25 ft in approximately 100 ft to tailwater from spillway.	
EMERGENCY GATE	NONE OBSERVED	

UNTERMEYER DAM

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	GOOD CONDITIONS	4 ft. wide, 3 ft deep section of spillway removed to permit lowering of lake.
APPROACH CHANNEL	NONE OBSERVED	
DISCHARGE CHANNEL	BROOK	
BRIDGE AND PIERS	Concrete masonry pier at right side of spillway rock falling from face of pier, and upstream end broken off- portion of pier appears submerged.	

UNTERMEYER DAM

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	ROCKY AND STABLE WITH EROSION OF SLOPE ALONG SAWMILL ROAD AT LEFT END OF RESERVOIR.	
SEDIMENTATION	CONSIDERABLE SEDIMENTATION PROBABLE AT SOUTH END OF LAKE. MAXIMUM DEPTH OF LAKE REPORTED TO BE ABOUT 14 FT. AT NORTH END NEAR EMBANKMENT.	

UNTERMEYER DAM

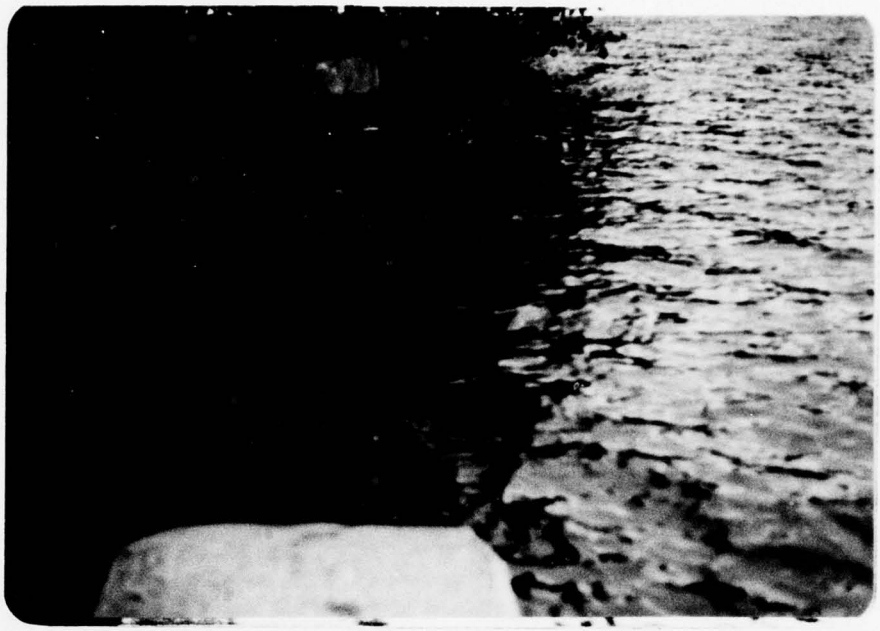
DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Small dead wood logs and boulders.	
SLOPES	1 v: 30 to 50h	
APPROXIMATE NO. OF HOMES AND POPULATION	Lincoln Park is identified as nearest D/S city with population of 9,034 on N.J. Dam Inventory prepared under PL 92-367.	Outlet in Sawmill Pond flood control to be checked on Sawmill Pond

APPENDIX 2

PHOTOGRAPHS

UNTERMEYER DAM

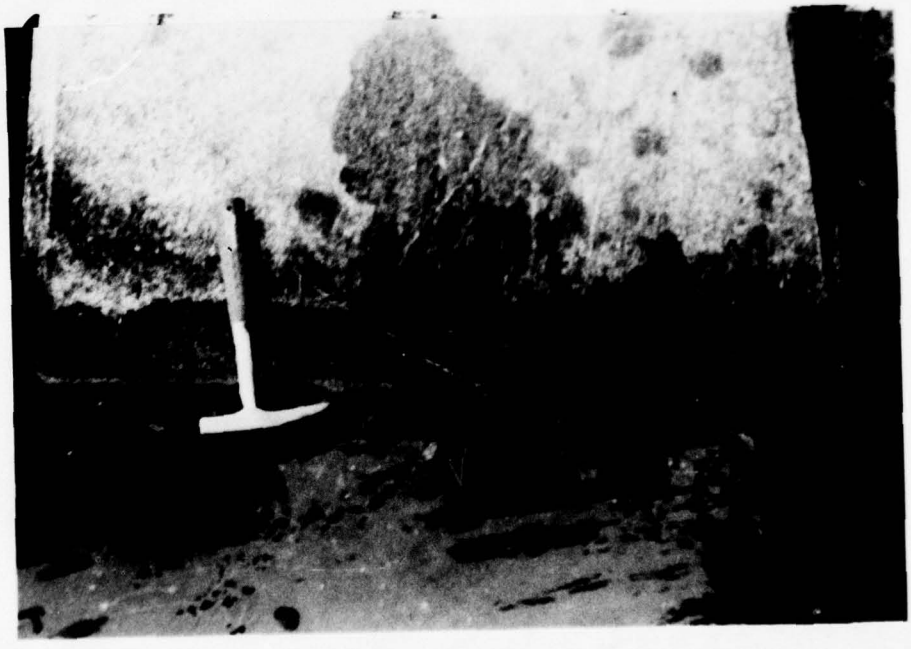


Spillway looking South 8 June 1978

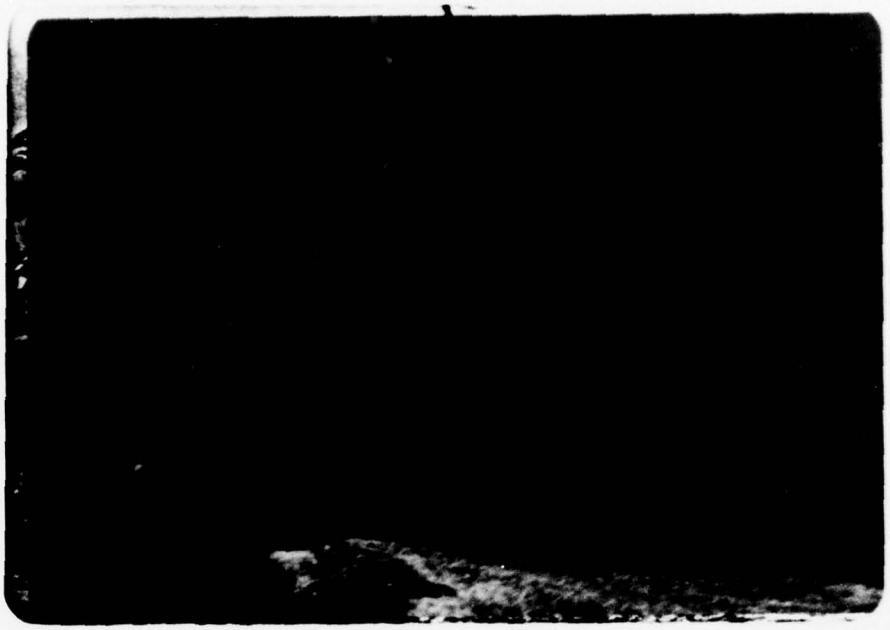
Spillway Looking Upstream 8 June 1978

UNTERMEYER DAM

Concrete-Rock abutment at left side of spillway — 8 June 1978



Crack in concrete spillway crest — 8 June 1978



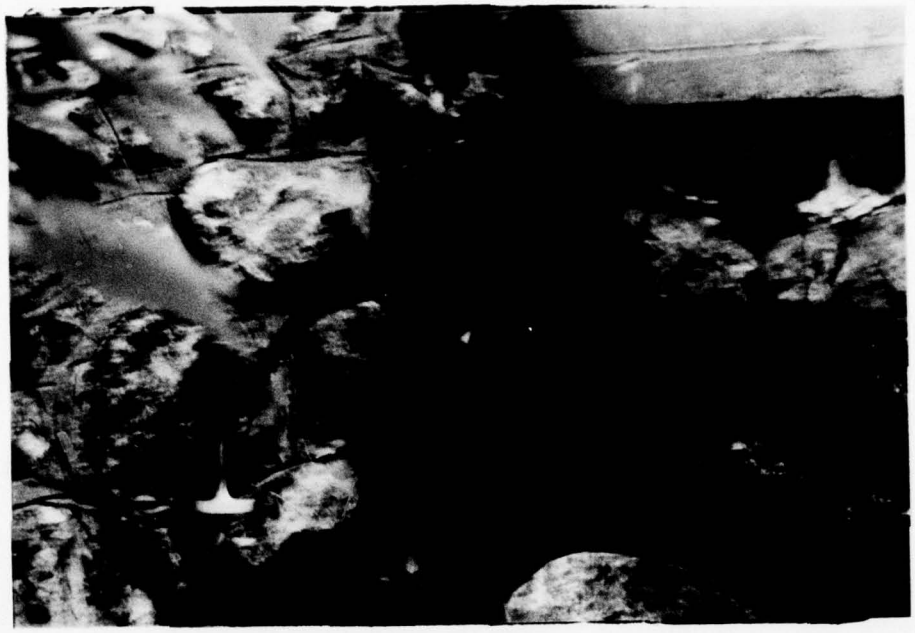
Extension of right spillway abutment wall below water level. 8 June 1978

Failure of masonry at end of right spillway abutment wall 8 June 1978

Seepage at left spillway abutment. 8 June 1978

Seepage at downstream right corner of spillway face. 8 June 1978

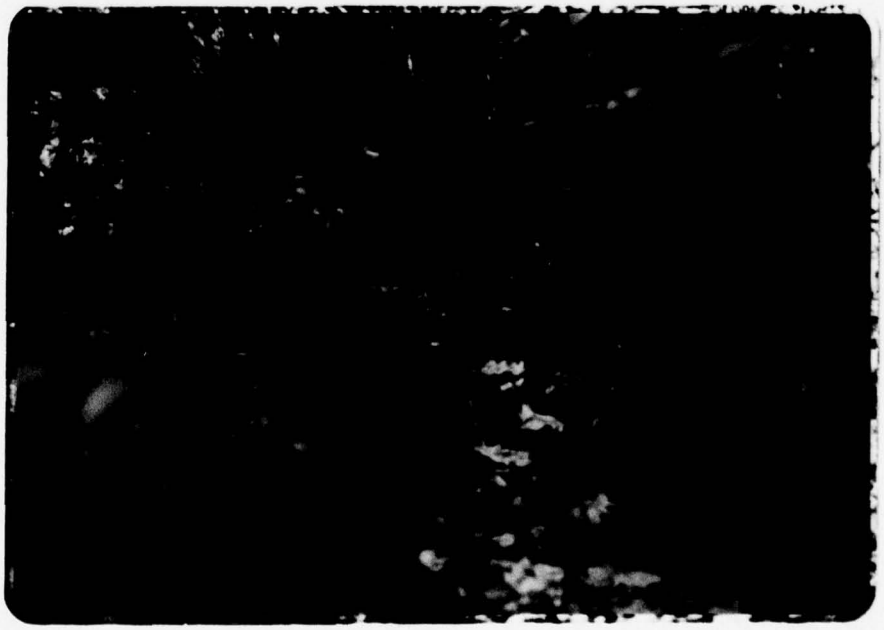
UNTERMEYER DAM



Rock falling from masonry at downstream corner of spillway and right abutment. 8 June 1978

Rock falling from masonry at downstream corner of spillway and right abutment. 8 June 1978

Base of trees and crest of embankment at approximately the same level as lake. 8 June 1978



Tree roots across embankment crest 8 June 1978

UNTERMEYER DAM

Spillway discharge channel looking upstream. 8 June 1978

Spillway discharge channel looking downstream. 8 June 1978

UNTERMEYER DAM

Leak at downstream face of embankment.

29 June 1978

UNTERMEYER DAM

Tree root across crest of embankment and above location of downstream leak. Note leakage at bottom left of lower photo.

8 June 1978

UNTERMEYER DAM

APPENDIX 3

ENGINEERING COMPUTATIONS

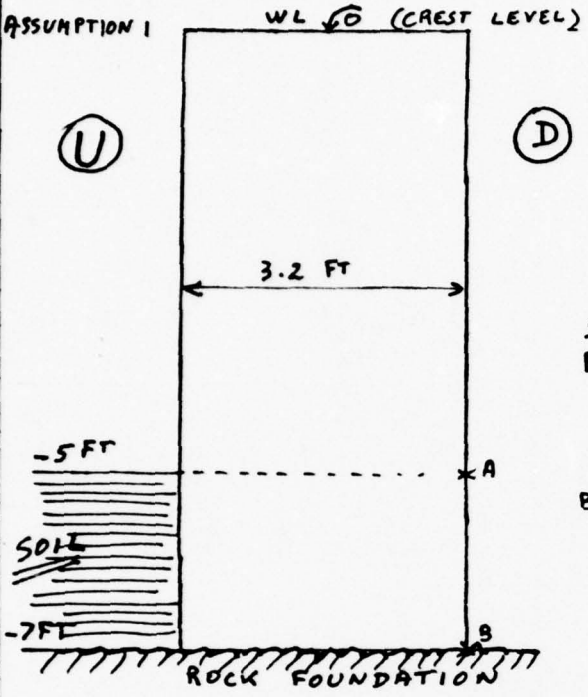
UNTERMEYER DAM

LANGAN ENGINEERING ASSOCIATES, INC.

UNTERMEYER LAKE
SPILLWAY

ASSUMPTION 2 ——— WL +1 FT

ASSUMPTION 1 WL 60 (CREST LEVEL)



- MASONRY ASSUMED TO BE 144 lb/FT³
- ACTIVE PRESSURE COEFFICIENT OF SOIL ASSUMED TO BE 0.5
- IMMERSED WEIGHT OF SOIL 62.5 lb/FT³
- TRIANGULAR UPLIFT ON HORIZ. SECTIONS ABOVE UPSTREAM BACKFILL 100% ON U. FACE 0% ON D. FACE
- NO UPLIFT ON HORIZONTAL SECTIONS BELOW BACFILL
- COEFFICIENT OF FRICTION MASONRY/MASONRY or MASONRY/ROCK ASSUMED TO BE .8

CASE I W.L AT CREST LEVEL

STABILITY AT -5 FT

HORIZONTAL FORCES $\frac{5^2}{2} \times 62.5 = 780$ lb/FT $M^T/A = 780 \times \frac{5}{3} = -1300$ lb FT/FT

Vertical Forces

WEIGHT $5 \times 3.2 \times 144 = 2300$ lb/FT $M^T/A = 2300 \times \frac{3.2}{2} = +3700$ lb FT/FT

UPLIFT $5 \times 3.2 \times 0.5 \times 62.5 = -500$ lb/FT $M^T/A = 500 \times 3.2 \times \frac{2}{3} = -1070$ lb FT/FT

STABILITY AGAINST SLIDING $S.F. = \frac{0.8(2300-500)}{780} = 1.85$

OVERTURNING $SF = \frac{3700-1070}{1300} = 2.0$

STABILITY AT -7 FT

HORIZONTAL FORCES

WATER $\frac{7^2}{2} \times 62.5 = 1540$ lb/FT $M^T/B = -1540 \times \frac{7}{3} = -3600$ lb FT/FT

SOIL $\frac{5^2}{2} \times .5 \times 62.5 = 62.5$ lb/FT $M^T/B = -62.5 \times \frac{2}{3} = -41.5$ "

1600 lb/FT 3640 lb FT/FT

VERTICAL FORCES

WEIGHT $7 \times 3.2 \times 144 = 3240$ lb/FT $M^T/B = 3240 \times \frac{3.2}{2} = 5200$ lb FT/FT

STABILITY AGAINST SLIDING $SF = \frac{0.8(3240-0)}{1600} = 1.6$

STABILITY AGAINST OVERTURNING $SF = \frac{5200}{3640} = 1.43$

BY JMAP DATE 12/6/78 Spillway JOB NO.

CKD JC DATE 8/7/78 Stability SHEET NO. 1 OF 2

LANGAN ENGINEERING ASSOCIATES, INC.

UNTERMEYER LAKE
SPILLWAY

CASE 2 W.L 1 FT ABOVE CREST LEVEL

- STABILITY AT -5 FT

HORIZONTAL FORCES

$\frac{6^2}{2} \times 62.5 = 1130$ lb/ft $\quad M^c/_A = -1130 \times \frac{6}{3} = -2260$ lb·ft/ft

$-\frac{1^2}{2} \times 62.5 = -30$ lb/ft $\quad M^c/_A = +30 \times 5.33 = +160$

-1100 lb/ft $\quad -2100$ lb·ft/ft

VERTICAL FORCES

WEIGHT OF WALL	$5 \times 3.2 \times 144 = 2300$ lb/ft	$M_{c/A} = 2300 \times 1.6 = 3680$
WATER	$1\text{ FT} \times 62.5 \times 3.2 = 200$ lb/ft	$= 200 \times 1.6 = 320$
UPLIFT	$6 \times 3.2 \times 0.5 \times 62.5 = -600$ lb/ft	$= -600 \times \frac{3.2 \times 2}{3} = -1360$
	$+1900$ lb/ft	-2640

STABILITY AGAINST SLIDING $\quad SF = \frac{0.8 \times 1900}{1100} = 1.4$

STABILITY AGAINST OVERTURNING $\quad SF = \frac{2640}{2100} = 1.26$

- STABILITY AT -7 FT

HORIZONTAL FORCES

WATER: $\frac{8^2}{2} \times 62.5 = 2000$ lb/ft $\quad M^c/_B = -2000 \times \frac{8}{3} = -5340$

$-\frac{1}{2} 62.5 = -30$ lb/ft $\quad M^c/_B = +30 \times 7.33 = -220$

SOIL: $\frac{2^2 \cdot 8}{2} \times 0.5 \times 62.5 = 62.5$ $\quad M^c/_B = -62.5 \times \frac{2}{3} = -41.5$

-2030 $\quad -5160$

VERTICAL FORCES

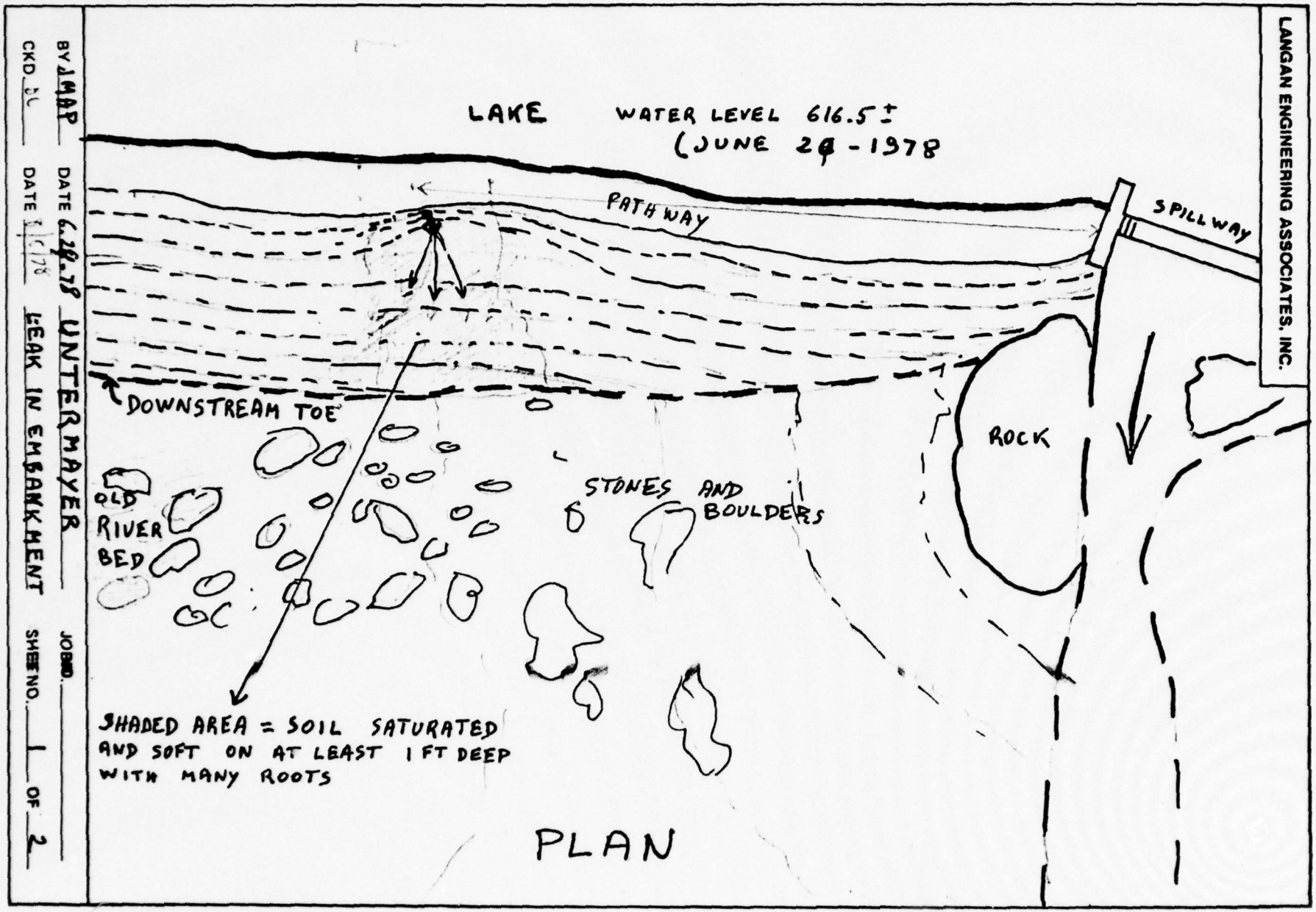
WEIGHT WALL	$7 \times 3.2 \times 144 = 3240$	$M_{c/B} = 3240 \times 1.6 = 5200$
WATER	$1 \times 62.5 \times 3.2 = 200$	$" = 200 \times 1.6$ $\quad 320$
	-3440 lb/ft	-5520

STABILITY AGAINST SLIDING $\quad \frac{0.8 \times 3440}{2030} = 1.35$

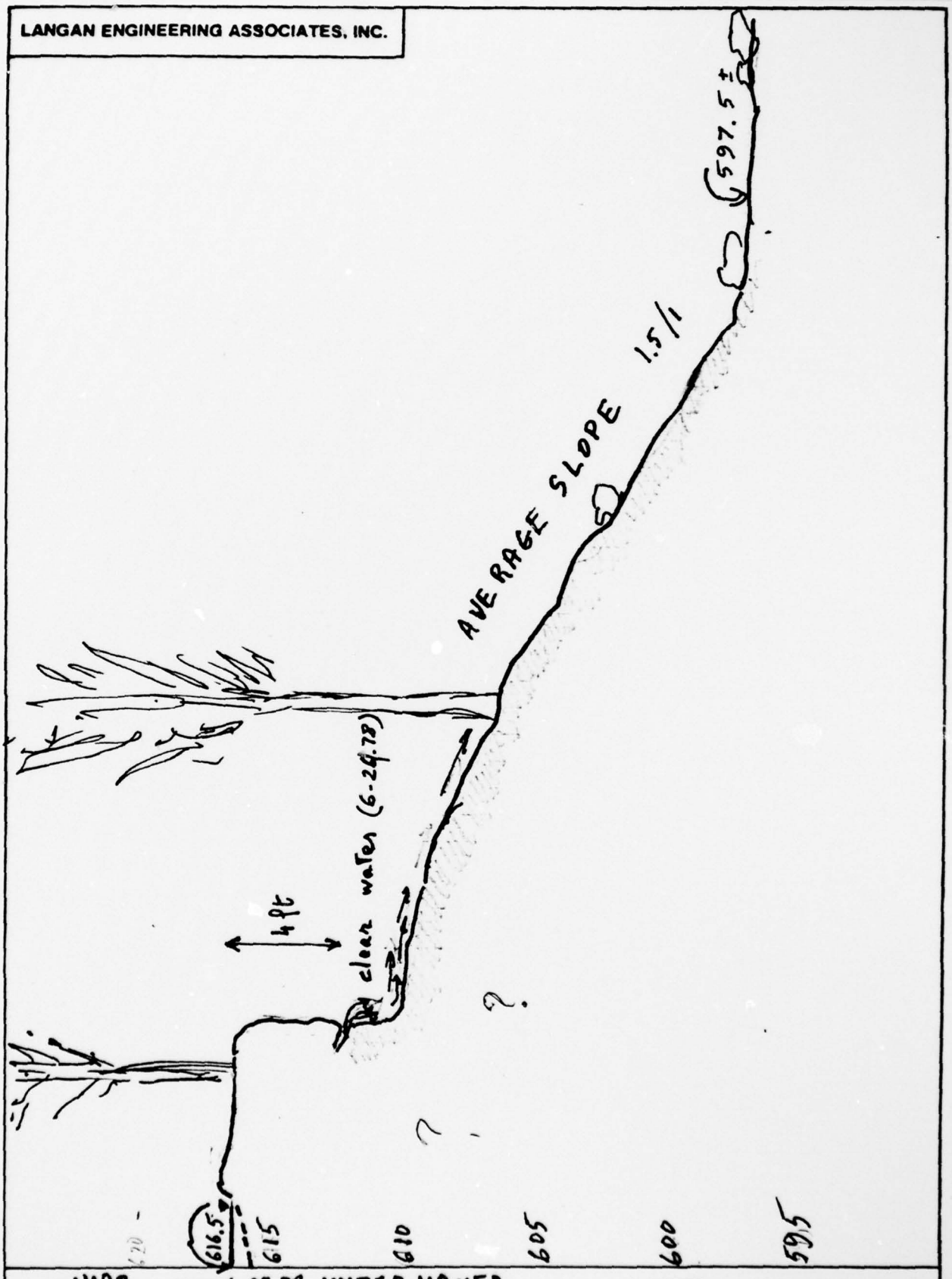
STABILITY AGAINST OVERTURNING $\quad \frac{5520}{5160} = 1.07$

BY JMAP DATE 12/6/78 Spillway JOB NO.

CKD. JC DATE 8/7/79 Stability SHEET NO. 2 OF 2


LAKE
WATER LEVEL 616.5±
(JUNE 29 - 1978
PATH WAY
SPILL WAY
DOWNSTREAM TOE
ROCK
STONES AND BOULDERS
OLD RIVER BED
SHADED AREA = SOIL SATURATED AND SOFT ON AT LEAST 1 FT DEEP WITH MANY ROOTS
PLAN
LANGAN ENGINEERING ASSOCIATES, INC.
BY JMAP DATE 6-29-78 UNTERMAYER JOB NO.
CKD. DATE 7/6/78 LEAK IN EMBANKMENT SHEET NO. 1 OF 2

LANGAN ENGINEERING ASSOCIATES, INC.



BY JMAP DATE 6.29.78 UNTER MAYER JOB NO.

CKD DL DATE 8/8/78 LEAK THRU EMBANKMENT SHEET NO. 2 OF 2

APPENDIX 4

HYDROLOGIC COMPUTATIONS

UNTERMEYER DAM

LANGAN ENGINEERING ASSOCIATES, INC.

HYDROLOGIC CALCULATIONS
UNTERMEYER LAKE DAM

A. Location - Morris County, N.J in the Passaic River Basin

B. Drainage Basin = 301 acres or .47 sq mi
Area of Lake = 16 acres

C. Classifications
Size — Small < 1000 acft storage
Hazard — High downgraded to significant

D. Spillway Design Flood - 100 yr to ½ PMF
½ PMF selected

E. Calculate ½ PMF

1. Untermeyer located in Zone 6 PMP = 22.5 (200 sq mile, 24 hr)

2. PMP must be adjusted for basin size

Duration (hr)	% of 24 hr value for 10 sq mi	Reduction Factor *
0-6	112	.8 all hours
0-12	123	
0-24	132	
0-48	142	

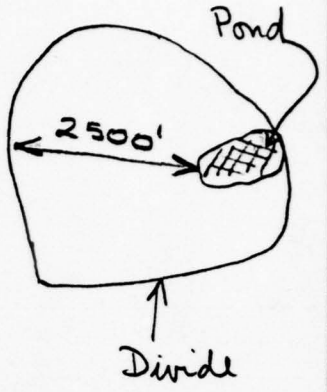
* page 48 "Small Dams"

BY JC DATE ____ Untermeyer Dam JOB NO. J-783
CKD GED DATE 8.9.78 Rev 8.16.78 SHEET NO. 1 OF 10

LANGAN ENGINEERING ASSOCIATES, INC.

DETERMINE TIME OF CONCENTRATION

There are no streams or channels in the Untermeyer water shed ∴ use overland flow



avg Slope = 5 %

avg length = 2500 feet

From a site inspection The ground cover is "Forest with Heavy Ground Litter & Meadow"

From SCS Tech Rel #55

A Fig 3.1

velocity = 0.56 ft/sec

$$T_c = \frac{\text{length}}{\text{velocity}} = \frac{2500}{0.56(3600)} = 1.24 \text{ hours}$$

$T_c = 1.24$ hours

B Determine Tc by Fig 3.3 Tech Rel #55

Take l = Greatest flow length

= 3200 ft

Lag Time = 0.66 hours

BY JC	DATE 8/5	Untermeyer	JOB NO. J-783
CKD GED	DATE 8-9-78		SHEET NO. 2 OF 10

$$T_c = \frac{0.66}{0.6} = 1.11 \text{ hours}$$

CHOOSE $\boxed{T_c = 1.25 \text{ HOURS}}$

DETERMINE TIME TO PEAK

$$T_P = \frac{D}{2} + 0.6\,T_c$$

Take D between .2 T_c & .3 T_c

$\therefore D = 0.30$ hours

& $T_P = \frac{0.30}{2} + 0.6(1.25) = 0.9$ hours

$\therefore \boxed{T_P = 0.9 \text{ HOURS}}$

UNIT HYDROGRAPH

Take q_P from SCS formula

$$q_P = \frac{484A}{T_P} = \frac{484(.47)}{0.9} = 252 \text{ cfs}$$

LANGAN ENGINEERING ASSOCIATES, INC.

A curvilinear hydrograph may be constructed from the values of q_p and T_p by using ratios tabulated in "Design of Small Dams" pg 74.

Take the time increments = D

HOURS	T/T_p	q/q_p	UNIT HYDROGRAPH q (CFS)
0.3	.333	0.18	45
0.6	.667	0.74	186
0.9	1.00	1.00	252
1.2	1.33	0.83	209
1.5	1.67	0.51	129
1.8	2.00	0.32	81
2.1	2.33	0.20	50
2.4	2.67	0.12	30
2.7	3.00	0.075	19
3.0	3.33	0.044	11
3.3	3.67	0.024	6
3.6	4.0	0.018	5
3.9	4.33	0.016	4

$\Sigma q = 1027$ CFS

Area Under Unit Graph (in) $= \dfrac{1027\,(.3\text{ hr})\,(3600)\,(12)}{(301\text{ acres})\,43{,}560} = 1.02$

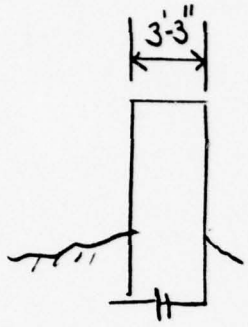
BY JC DATE 8/5 Untermeyer JOB NO. J-783

CKD [illegible] DATE 8/9/78 SHEET NO. 4 OF 10

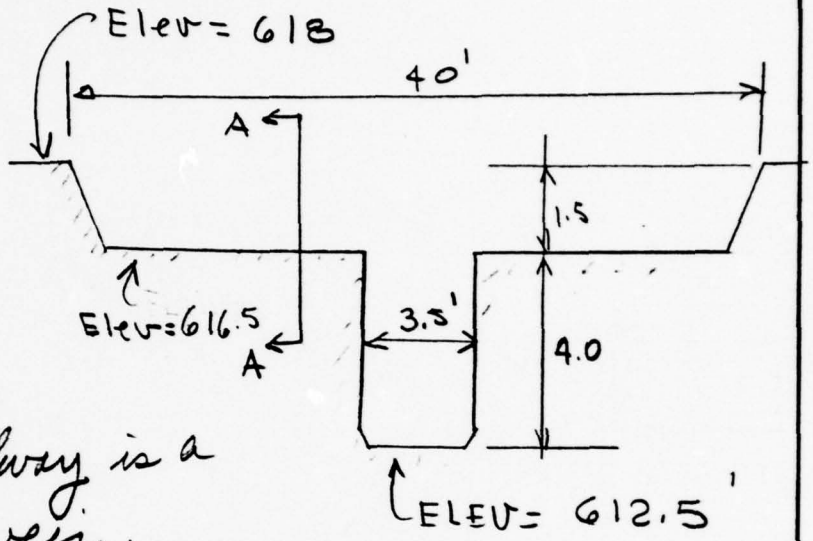
LANGAN ENGINEERING ASSOCIATES, INC.

SPILLWAY CAPACITY

$Q = CLH^{3/2}$



SECTION A-A



Assume the spillway is a broad crested weir.

From "Handbook of Hydraulics" King & Brater pg 5-46 $2.44 \leq C \leq 3.32$

Notched spillway Crest Elev = 612.5

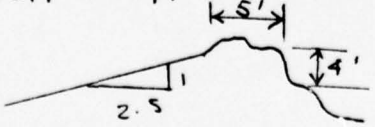
$L = 3.5'$

Flange Spillway Crest Elev = 616.5

Take $L = 35'$

Reservoir Top Elev = 617.5

Reser. wall cross section



King & Brater, Table 5-12 & FIG 5-12 $C_{AVG} = 3.38$

BY JC	DATE 8/5	Untermeyer	JOB NO. J-783
CKD	DATE		SHEET NO. 5 OF 10

LANGAN ENGINEERING ASSOCIATES, INC.

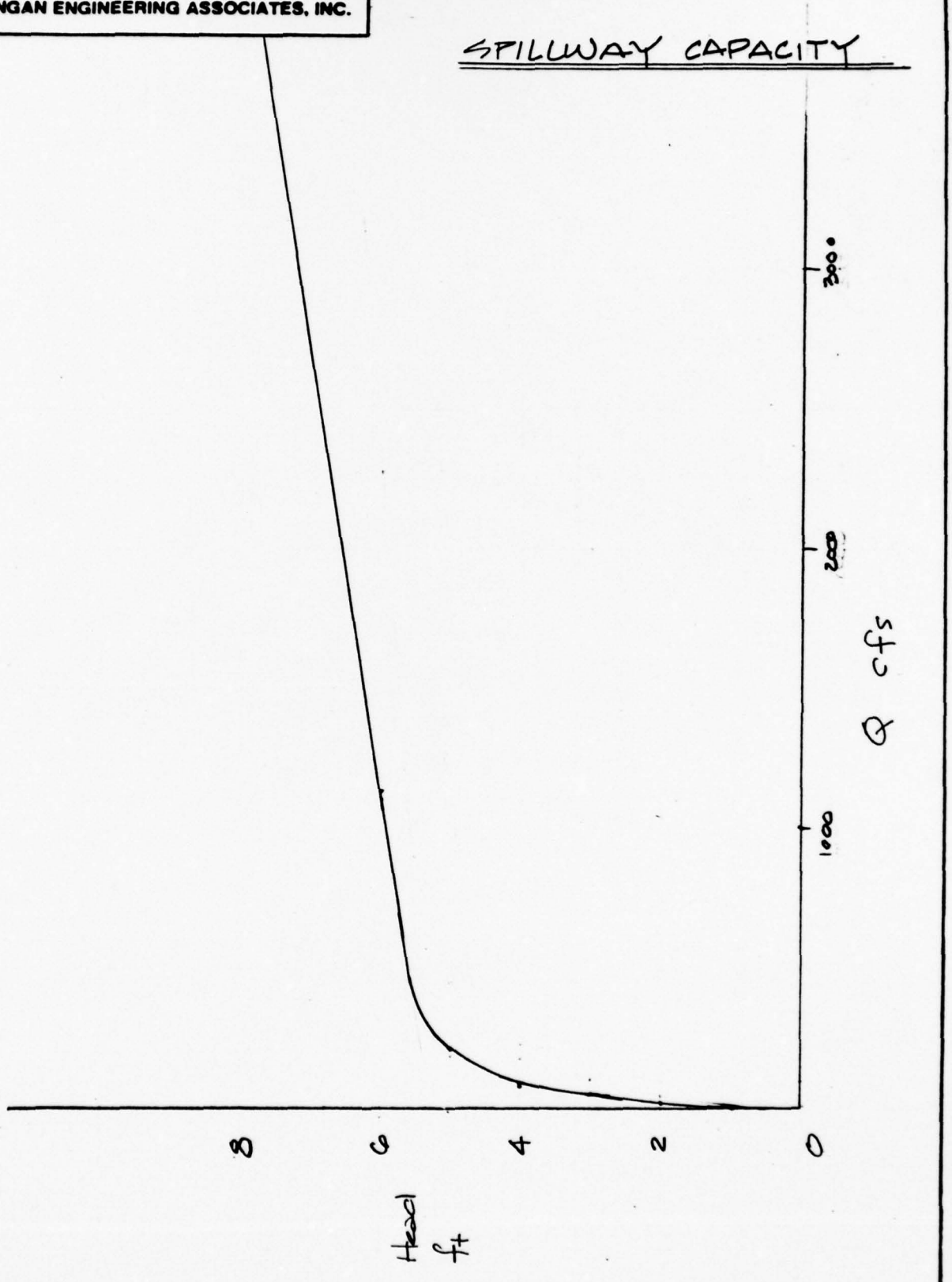
Elev	Notch H (ft)	Notch C	Notch Q cfs	Flange H ft	Flange C	Flange Q cfs	Reservoir H ft	Reservoir L ft	Reservoir Q (cfs)	Q TOTAL (cfs)
612.5	0		0							0
613.5	1.0	2.64	9							9
614.5	2.0	2.76	27							27
615.5	3.0	3.05	55							55
616.5	4.0	3.32	93	0						93
617.5	5.0	3.32	130	1	2.64	92	0			222
618.0	5.5	3.32	150	1.5	2.70	174	0.5	100	119	443
618.5	6.0	3.32	171	2	2.76	273	1.0 0.5	100 300	338 358	1140
619.5	7.0	3.32	215	3	3.05	556	2	400	3824	4595

Length of notch = 3.5'
Length of flange = 35

BY JC DATE 8/5 Untermeyer JOB NO. J-783
CKD JED DATE 8.8.78 8.16.78 SHEET NO. 6 OF 10

LANGAN ENGINEERING ASSOCIATES, INC.

SPILLWAY CAPACITY



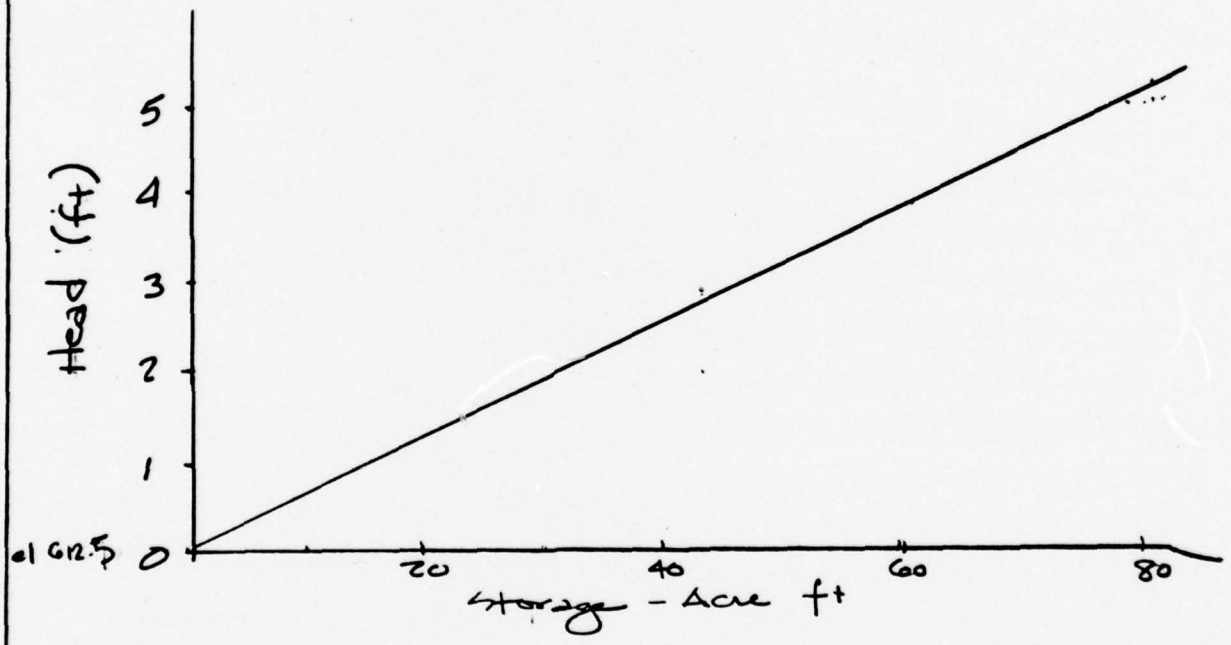
BY _____ DATE _____ Untermeyer JOB NO. J-783

CKD GED DATE 8.9.78 Rev 8.16.78 SHEET NO. 7 OF 10

LANGAN ENGINEERING ASSOCIATES, INC.

8. Storage Capacity of Reservoir

a. Before notch pond was 16 ± acres. After drawn down water level came in 10 ft. With a perimeter of 4000 ft approximately an acre was lost. Assume area of 15.0 acres for the 2.75 ft of depth. Storage for that depth equals 2.75 x 15.0 or 41.2 ac ft Assume lenear relationship above and below this elevation



BY JC DATE ____ Untermeyer JOB NO. J-783

CKD CED DATE 8-9-78 SHEET NO. 8 OF 10

LANGAN ENGINEERING ASSOCIATES, INC.

Elev.	$H_{(ft)}$	Q_{TOTAL} (cfs)	STORAGE (Acre-ft)
612.5	0	0	0
613.5	1	9	15
614.5	2	27	30
615.5	3	55	45
616.5	4	93	60
617.5	5	222	75
618.0	5.5	443	82.5
618.5	6	1140	90
619.5	7	4595	105

HYDROGRAPH & FLOOD ROUTING

1. Hydrograph and flood routing determined using HEC-1; output is attached
2. ½ PMF = 910 cfs (Routed to 893 cfs)
3. Routing indicates dam will overtop for ½ PMF. Overtopping begins to occur at approximately elevation 617.2. For ½ PMF the dam will be overtopped by approx. 1.1 ft

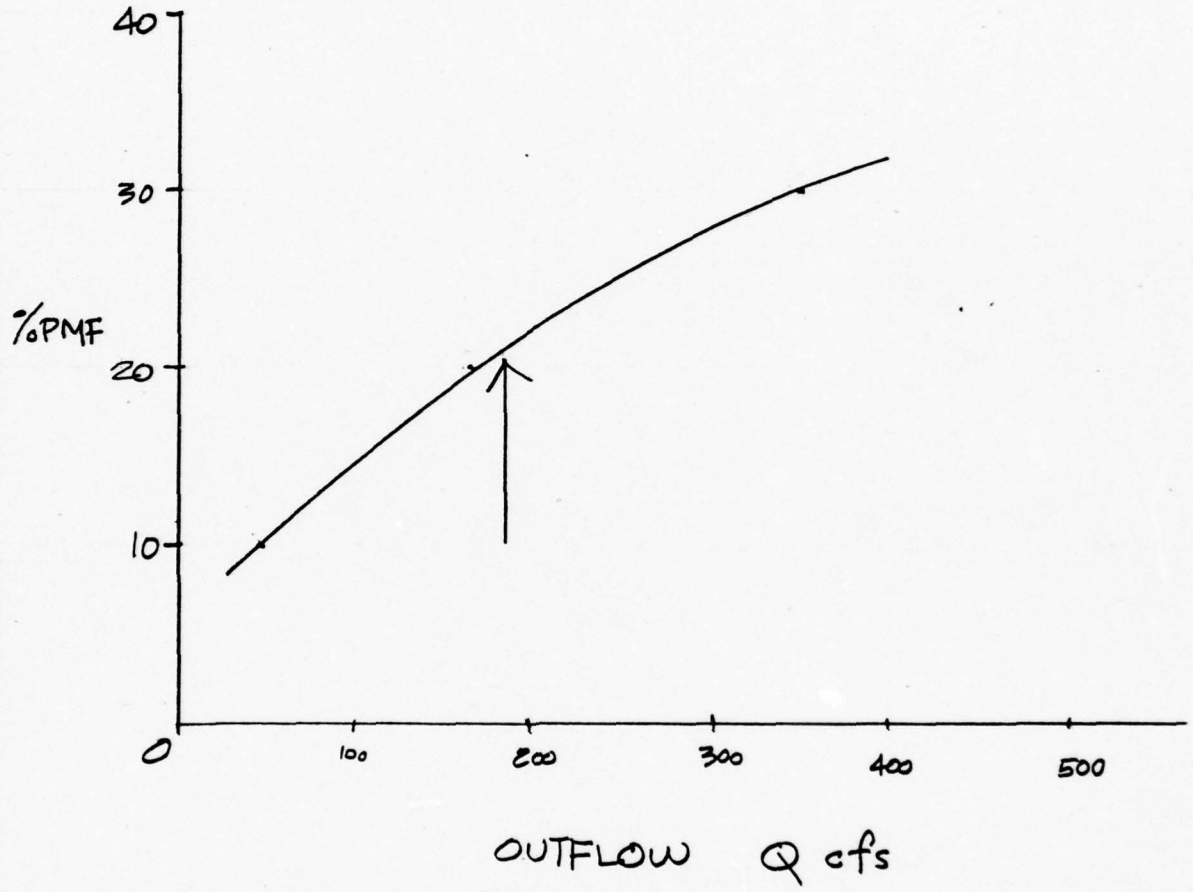
BY JC DATE 8/5 Untermeyer JOB NO. J-783

CKD CED DATE 8.9.78 Rev 8.16.78 SHEET NO. 9 OF 10

LANGAN ENGINEERING ASSOCIATES, INC.

OVERTOPPING POTENTIAL

1. Various % PMF have been routed (HEC-1 attached)
2. Plot peak outflow vs % PMF



3. overtopping occurs at el 617.2 ± Q ≅ 183

∴ Dam can pass approximately 21% PMF

BY _____ DATE _____ Untermeyer JOB NO. J-783

CKD GED DATE 9.9.78 SHEET NO. 10 OF 10


Deer Pond
Taylortown Reservoir
Taylortown Reservoir
BOONTON
Mountain
Turkey Mtn
Lake Valhalla
Lake Valhalla
Surprise Lake
Waughaw Mtn
MAIN
Towaco
School No 4
Cem
Montville Airport

MAP SOURCE USGS
BOONTON & POMPTON PLAINS
SCALE 1"=2000'

DRAINAGE BASIN
UNTERMEYER LAKE

LANGAN ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
970 CLIFTON AVE. CLIFTON, N.J. 07013 201 472-3306

HEC-1 OUTPUT

UNTERMEYER DAM

```
istef until 'breakdown'-

FI       10:05 AUG 16,'78

S09 JOB 2662 (LANG0992) IN BREAKDOWN
DC1B            LANG0992      2662      PT06F001          9.23.59  16 AUG 78        GED                              GED

**************************
C-1 VERSION DATED JAN 1973
DATED AUG 74
ANGE NO. 01
**************************

**************************
C-1 VERSION DATED JAN 1973
DATED AUG 74
ANGE NO. 01
**************************
                        UNTERMEYER LAKE
                        DETERMINE INFLOW HYDROGRAPH FOR PMF AND .5PMF AND ROUT
                        N.J. DAM INSPECTION

                                                JOB SPECIFICATION
                                 NQ    NHR   NMIN   IDAY    IHR   IMIN METRC   IPLT   IPRT NSTAN
                                 90      0     18      0      0      0      0      0      0      0
                                                      JOPER      NWT
                                                          5        0


                                              MULTI-PLAN ANALYSES TO BE PERFORMED
                                                  NPLAN# 1 NRTIO# 2 LRTIO# 1
                                RTIOS#   1.00   0.50


**********          **********          **********          **********          **********

                                              SUB-AREA RUNOFF COMPUTATION

                                COMPUTE HYDROGRAPH
                                          ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME
                                            1        0        0        0        0        0        1

                                                                HYDROGRAPH DATA
                                IHYDG     IUHG    TAREA     SNAP     TRSDA     TRSPC     RATIO     ISNOW     ISAME     LOCAL
                                    1       -1     0.47      0.0      0.47      0.80      0.0           0         0         0

                                                                PRECIP DATA
                                      SPFE      PMS       R6       R12       R24       R48       R72       R96
                                      0.0     22.50   112.00   123.00   132.00      0.0       0.0       0.0
```

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOR	STRTL	CNSTL	ALSMX	RTIMP
0.0	0.0	1.00	0.0	0.0	1.00	1.00	0.20	0.0	0.0

GIVEN UNIT GRAPH, NUHGQ# 13

45. 186. 282. 209. 129. 81. 50. 30. 19. 11.
6. 5. 4.

UNIT GRAPH TOTALS 1057. CFS OR 1.05 INCHES OVER THE AREA

RECESSION DATA

STRTQ# -2.00 QRCSN# 0.0 RTIOR# 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.03	0.00	1.
2	0.03	0.00	1.
3	0.03	0.00	1.
4	0.03	0.00	1.
5	0.03	0.00	1.
6	0.03	0.00	1.
7	0.03	0.00	1.
8	0.03	0.00	1.
9	0.03	0.00	1.
10	0.03	0.00	1.
11	0.03	0.00	1.
12	0.03	0.00	1.
13	0.03	0.00	1.
14	0.03	0.00	1.
15	0.03	0.00	1.
16	0.03	0.00	1.
17	0.03	0.00	1.
18	0.03	0.00	1.
19	0.03	0.00	1.
20	0.03	0.00	1.
21	0.10	0.00	1.
22	0.10	0.00	1.
23	0.10	0.00	1.
24	0.10	0.02	2.
25	0.10	0.04	6.
26	0.10	0.04	15.
27	0.10	0.04	25.
28	0.10	0.04	31.
29	0.10	0.04	36.
30	0.10	0.04	38.
31	0.10	0.04	40.
32	0.10	0.04	41.
33	0.10	0.04	41.
34	0.10	0.04	42.
35	0.10	0.04	42.
36	0.10	0.04	42.

37	0.10	0.04	42.
38	0.10	0.04	42.
39	0.10	0.04	42.
40	0.10	0.04	42.
41	0.60	0.54	65.
42	0.60	0.54	159.
43	0.60	0.54	302.
44	0.73	0.67	413.
45	0.73	0.67	501.
46	0.73	0.67	576.
47	0.91	0.85	634.
48	0.91	0.85	699.
49	0.91	0.85	769.
50	2.30	2.24	882.
51	2.30	2.24	1170.
52	2.30	2.24	1582.
53	0.85	0.79	1820.
54	0.85	0.79	1736.
55	0.85	0.79	1443.
56	0.67	0.61	1204.
57	0.67	0.61	1025.
58	0.67	0.61	884.
59	1.52	1.46	828.
60	1.52	1.46	928.
61	0.05	0.00	1067.
62	0.05	0.00	955.
63	0.05	0.00	640.
64	0.05	0.00	393.
65	0.05	0.00	240.
66	0.05	0.00	146.
67	0.05	0.00	89.
68	0.05	0.00	54.
69	0.05	0.00	31.
70	0.05	0.00	19.
71	0.05	0.00	14.
72	0.05	0.00	7.
73	0.05	0.00	1.
74	0.05	0.00	1.
75	0.05	0.00	1.
76	0.05	0.00	1.
77	0.05	0.00	1.
78	0.05	0.00	1.
79	0.05	0.00	1.
80	0.05	0.00	1.
81	0.0	0.0	1.
82	0.0	0.0	1.
83	0.0	0.0	1.
84	0.0	0.0	1.
85	0.0	0.0	1.
86	0.0	0.0	1.
87	0.0	0.0	1.

88	0.0	0.0	1.
89	0.0	0.0	1.
90	0.0	0.0	1.
SUM	24.82	20.68	21885.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1820.	988.	273.	243.	21881.
INCHES		19.55	21.64	21.65	21.65
AC-FT		490.	543.	543.	543.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	2.	6.	15.	25.	31.	36.	38.
40.	41.	41.	42.	42.	42.	42.	42.	42.	42.
65.	159.	302.	413.	501.	576.	634.	699.	769.	882.
1170.	1582.	1820.	1736.	1443.	1204.	1025.	884.	828.	928.
1067.	955.	640.	393.	240.	146.	89.	54.	31.	19.
14.	7.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1820.	988.	273.	243.	21881.
INCHES		19.55	21.64	21.65	21.65
AC-FT		490.	543.	543.	543.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	3.	7.	12.	16.	18.	19.
20.	20.	21.	21.	21.	21.	21.	21.	21.	21.
32.	80.	151.	206.	250.	288.	317.	349.	385.	441.
585.	791.	910.	868.	722.	602.	513.	442.	414.	464.
534.	477.	320.	197.	120.	73.	44.	27.	16.	10.
7.	3.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	910.	494.	137.	122.	10940.
INCHES		9.77	10.82	10.83	10.83
AC-FT		245.	271.	271.	271.

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTING COMPUTATIONS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME

			1	1	0	0	0	0	1	

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	1	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.0	0.0	0.0	0.

STORAGE	15.	30.	45.	60.	75.	82.	90.	105.	0.	0.
OUTFLOW	9.	27.	55.	93.	222.	443.	1140.	4595.	0.	0.

STATION 1, PLAN 1, RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	2.	3.	4.	5.	6.	7.
9.	12.	18.	29.	48.	75.	139.	276.	611.	834.
1033.	1496.	1800.	1767.	1504.	1236.	1081.	950.	852.	879.
1002.	1011.	789.	506.	371.	271.	209.	183.	156.	131.
109.	92.	87.	81.	76.	72.	68.	63.	60.	56.
53.	51.	49.	47.	44.	43.	41.	39.	37.	35.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	1.	1.	1.	1.	1.	2.	3.	4.
5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
15.	17.	23.	31.	41.	53.	65.	77.	84.	86.
89.	92.	93.	93.	92.	90.	89.	88.	87.	87.
88.	89.	86.	83.	80.	77.	74.	70.	67.	64.
62.	60.	57.	55.	53.	52.	50.	48.	47.	45.
44.	43.	42.	40.	39.	38.	37.	36.	35.	35.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1800.	924.	256.	228.	20506.
INCHES		18.29	20.29	20.29	20.29
AC-FT		458.	509.	509.	509.

STATION 1, PLAN 1, RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	2.	5.	10.	17.	24.	35.	49.	66.	87.
156.	328.	774.	893.	791.	657.	553.	474.	434.	437.
496.	506.	417.	328.	232.	199.	172.	146.	122.	101.
90.	85.	80.	75.	70.	66.	62.	58.	55.	52.
50.	48.	46.	44.	42.	40.	38.	36.	35.	33.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	2.
2.	3.	3.	4.	4.	5.	5.	6.	7.	7.
8.	9.	12.	16.	21.	28.	34.	42.	49.	58.
67.	78.	86.	87.	86.	84.	83.	82.	82.	82.
83.	83.	81.	78.	75.	72.	69.	66.	63.	61.
59.	57.	55.	53.	51.	49.	48.	46.	45.	44.
42.	41.	40.	39.	38.	37.	36.	35.	34.	33.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	893.	411.	120.	107.	9614.
INCHES		8.13	9.51	9.51	9.51
AC-FT		204.	238.	238.	238.

********** ********** ********** ********** **********

PEAK FLOW SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS

ERATION	STATION	PLAN	RATIOS APPLIED TO FLOWS 1.00	0.50
DROGRAPH AT	1	1	1820.	910.
		2	0.	0.
UTED TO	1	1	1800.	893.
		2	0.	0.

MCDONNELL DOUGLAS AUTOMATION COMPANY -- ST. LOUIS
OS/MVT RELEASE 21.7 COMPUTER SYSTEM SY0

P JOB NO. = 2662 JOBNAME = LANG0992 START TIME = 09.23.50 START DATE = 08/16/78

* * * * * * * * * * STEP RESOURCES * * * * * * * * * *

EPNAME	COND CODE	COMP CODE	CORE USED	REGION REQUEST	DASD TRKS	DISK UNITS	TAPE UNITS	DASD I/O (MIN)	TAPE I/O (MIN)	CPU (MIN)	STEP TIME (MIN)	STEP MRU
	0000		194 K	194 K	100	1	0	.105	.000	.004	.057	.23

* TOTAL JOB USAGE * * * * * * MAIN RESOURCE UNIT SUMMARY * * * * * *
CPU USAGE - -

```
 listcf unt6a 'breakdown'-

UNT6A       10:20 AUG 16,'78

AMDS09 JOB 2743 (LANG0996) IN BREAKDOWN
 CDC1B            LANG0996       2743       FT06F001          9.31.26  16 AUG 78        GED                              GED

*****************************
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
*****************************

*****************************
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
*****************************
                         UNTERMEYER LAKE
                         DETERMINE INFLOW HYDROGRAPH FOR PMF AND .5PMF AND ROUT
                         % PMF

                                        JOB SPECIFICATION
                                NQ    NHR   NMIN   IDAY    IHR   IMIN METRC   IPLT   IPRT NSTAN
                                90      0     18      0      0      0      0      0      4      0
                                                     JOPER      NWT
                                                         5        0


                                        MULTI-PLAN ANALYSES TO BE PERFORMED
                                             NPLAN# 1 NRTIO# 6 LRTIO#10
                               RTIOS#   1.00    0.50    0.40    0.30    0.20    0.10


          **********          **********          **********          **********          **********

                                        SUB-AREA RUNOFF COMPUTATION

                         COMPUTE HYDROGRAPH
                                   ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME
                                       1        0        0        0        0        0        1

                                                HYDROGRAPH DATA
                        IHYDG     IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
                            1       -1     0.47      0.0     0.47     0.80      0.0        0        0        0

                                                PRECIP DATA
                                SPFE      PMS       R6      R12      R24      R48      R72      R96
                                0.0     22.50   112.00   123.00   132.00      0.0      0.0      0.0
```

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.0	0.0	1.00	0.0	0.0	1.00	1.00	0.20	0.0	0.0

RECESSION DATA

STRTQ# -2.00 QRCSN# 0.0 RTIOR# 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
SUM	24.82	20.68	21885.

********** *********** *********** *********** **********

HYDROGRAPH ROUTING

ROUTING COMPUTATIONS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	0	0	0	0	1

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	1	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.0	0.0	0.0	0.

STORAGE#	15.	30.	45.	60.	75.	82.	90.	105.	0.	0.
OUTFLOW#	9.	27.	55.	93.	222.	443.	1140.	4595.	0.	0.

********** *********** *********** *********** **********

PEAK FLOW SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS

OPERATION	STATION	PLAN	RATIOS APPLIED TO FLOWS 1.00	0.50	0.40	0.30	0.20	0.10
HYDROGRAPH AT	1	1	1820.	910.	728.	546.	364.	182.
		2	0.	0.	0.	0.	0.	0.
ROUTED TO	1	1	1800.	893.	637.	348.	166.	48.
		2	0.	0.	0.	0.	0.	0.

APPENDIX 5

INVENTORY FORMS 4474 AND 4474-A

UNTERMEYER DAM

GENERAL INSTRUCTIONS

is form is for use in preparing the inventory of dams in the United States under the requirements of the National Program for e Inspection of Dams, P.L. 92-367. All items of Part I and Part II (Lines 0-9) must be completed as instructed below. Print tries distinctly in ink or pencil. For letters o, z, and i, write Ø, Z, and I.

rite only one letter or numeral in each space; do not use more letters than blocks allowed for an item. Do not abbreviate on rt I. Leave one space between words and no space between code letters.

or all letter codes or word entries place first letters in left block of field. In word fields any alphabetic, numeric or special aracter may be entered. For all numerical entries, use only numerals placing the last digit of number in the right block of eld, including trailing zeros. Do not include a decimal point! In fields where decimals are required values are to be placed around e decimal point printed on the form.

eave blank those spaces where item does not apply, e.g., do not write "N/A", "-", "None", etc., unless instructed to do so by ecific instructions. Use the remarks line when additional space is needed for an item, or to clarify an entry. Preface each remark ith the item number. (See Item ‖28‖ or ‖56‖ instructions)

PART I

em 1.1 IDENTITY: The Division Engineer will assign and control the identity for dams in the states for which he is responble. The first two characters of the identity will be the two-letter state abbreviation in accordance with Federal Information rocessing Standards Publication, June 15, 1970 (FIPS PUB 6-1). In cases where a dam is physically located in two or more ates, one state will be designated as the principal state for the identity. The last five (5) characters of the identity will be a quential number assigned to identify dams within a state.

LINE 0:

tem 1.2 DIVISION: Enter the three (3) letter office symbol for the division making the report in accordance with ABBR eport Code, Appendix B, ER 18-2-1, Civil Works Information System; e.g., NAD, ORD, SWD, etc.

ocation:

tem 1.3 STATE: Enter two (2) letter principal state abbreviation in accordance with FIPS PUB 6-1.
tem 1.4 COUNTY: Enter three (3) digit county identification in accordance with FIPS PUB 6-1.
tem 1.5 CONG DIST: Enter one (1) or two (2) digit number for congressional districts in which dam is located.
tem 1.6, 1.7, and 1.8 (Use second location for structures situated in more than one state.)

Item 1.9 DAM NAME: Enter official name of dam. Do not abbreviate unless the abbreviation is a part of the official name. For dams that do not have a name, create a name by combining the two (2) letter state abbreviation plus "NO NAME" plus a sequential number, e.g., if two dams in the State of Alabama do not have names, they would be named as ALNONAME 1 and ALNONAME 2.
Item ‖10‖ & ‖11‖ LATITUDE AND LONGITUDE: Enter the latitude and longitude in degrees, minutes and tenths of a minute. All geographical location items pertain to dam as its maximum section.
Item ‖12‖ REPORT DATE: Enter the one (1) or two (2) digits for day, the first three (3) letters of the month and a two (2) digit year (e.g., 12 JAN74) in which the data has been revised, updated or otherwise changed.

LINE 1:

Item ‖13‖ POPULAR NAME OF DAM: If (other than the official name of the dam) in common use, enter the name in this space. Leave blank if not applicable.
Item ‖14‖ NAME OF IMPOUNDMENT: Enter official name of lake or reservoir. Leave blank if reservoir does not have a name.

Item ‖15‖ & ‖16‖ REGION AND B
ER 18-2-1, Civil Works Information
Item ‖17‖ RIVER OR STREAM: E
indicate as tributary to river named,
Item ‖18‖ NEAREST DOWNSTRE
which can be located on a general m
Item ‖19‖ DISTANCE FROM DAM
Item ‖20‖ POPULATION: Enter p

Item ‖21‖ TYPE OF DAM: Enter

EARTH - RE
ROCKFILL - ER
GRAVITY PG

Item ‖22‖ YEAR COMPLETED: E
year can be determined, note this in
Item ‖23‖ PURPOSES: Enter one
should indicate the relative decreasi

IRRIGATION I
HYDROELECTRIC - H
FLOOD CONTROL - C

Item ‖24‖ STRUCTURAL HEIGH
vertical distance from the lowest p
Item ‖25‖ HYDRAULIC HEIGHT
height of the dam with respect to t
at the downstream toe of the barri
side limit of the barrier to the maxi

Impounding Capabilities:

Item ‖26‖ MAXIMUM: Enter the
the maximum attainable water sur
Item ‖27‖ NORMAL: Enter the
normal retention level, including d

Item ‖27A‖ CORPS OF ENGINE
the dam is geographically located,
SWF, etc.
Item ‖27B‖ OWNERSHIP: Ente
Corps of Engineers.
Item ‖27C‖ FEDERALLY REGU
Item ‖27D‖ PRIVATE DAMS O
Item ‖27E‖ ASSISTANCE BY S
cial Assistance; B for Both Techn
Item ‖27F‖ VERIFICATION:

Ite MARKS: Preface
TING BASIN.

ements of the National Program for
pleted as instructed below. Print

for an item. Do not abbreviate on

alphabetic, numeric or special
f number in the right block of
quired values are to be placed around

, etc., unless instructed to do so by
clarify an entry. Preface each remark

the states for which he is respon-
rdance with Federal Information
ysically located in two or more
racters of the identity will be a

eport in accordance with ABBR
VD, etc.

PUB 6-1.
B 6-1.
which dam is located.
.)

on is a part of the official name.
eviation plus "NO NAME" plus a
be named as ALNONAME 1

rees, minutes and tenths of a minute.

tters of the month and a two (2)

mon use, enter the name in this

k if reservoir does not have a name.

LINE 2:

Item [15] & [16] REGION AND BASIN: Enter two (2) digit numbers for Region and Basin in accordance with Appendix C, ER 18-2-1, Civil Works Information System.
Item [17] RIVER OR STREAM: Enter official name of river or stream on which the dam is built. If stream is without name, indicate as tributary to river named, e.g., TR-COLORADO. If off stream, enter name of river plus "OFFSTREAM".
Item [18] NEAREST DOWNSTREAM CITY-TOWN-VILLAGE: Enter the nearest downstream city-town-village of such size which can be located on a general map.
Item [19] DISTANCE FROM DAM: Enter distance from dam to nearest downstream city-town-village to the nearest mile.
Item [20] POPULATION: Enter population of city-town-village given in Item [18].

LINE 3:

Item [21] TYPE OF DAM: Enter two (2) letter codes, in any order, to describe type of dam.

EARTH - RE	BUTTRESS - CB	OTHER - OT
ROCKFILL - ER	ARCH - VA	(Describe "other" in remarks)
GRAVITY PG	MULTI-ARCH - MV	

Item [22] YEAR COMPLETED: Enter year when the main dam structure was completed and ready for use. If only approximate year can be determined, note this in remarks.
Item [23] PURPOSES: Enter one (1) letter codes that describe the purposes for which the reservoir is used. The order entered should indicate the relative decreasing importance of the project purposes.

IRRIGATION I	NAVIGATION - N	STOCK OR SMALL FARM POND - P
HYDROELECTRIC - H	WATER SUPPLY - S	DEBRIS CONTROL - D
FLOOD CONTROL - C	RECREATION - R	OTHER - O
		(Describe "other" in remarks)

Item [24] STRUCTURAL HEIGHT: Enter, to the nearest foot, the structural height of the dam which is defined as; the ove vertical distance from the lowest point of foundation surface to the top of the dam.
Item [25] HYDRAULIC HEIGHT: Enter, to the nearest foot, the hydraulic height of the dam which is defined as; the effective height of the dam with respect to the maximum storage capacity, measured from the natural bed of the stream or watercourse at the downstream toe of the barrier, or if it is not across a stream or watercourse, the height from the lowest elevation of the outside limit of the barrier to the maximum storage elevation.

Impounding Capabilities:

Item [26] MAXIMUM: Enter the acre feet for maximum storage which is defined as; the total storage space in a reservoir below the maximum attainable water surface elevation, including any surcharge storage.
Item [27] NORMAL: Enter the acre feet for normal storage which is defined as; the total storage space in a reservoir below the normal retention level, including dead and inactive storage and excluding any flood control or surcharge storage.

Item [27A] CORPS OF ENGINEERS DISTRICT: Enter the three character Corps of Engineers ABBR report code in which the dam is geographically located, in accordance with Appendix B, ER 19-2-1, Civil Works Information System, e.g., NAN, ORH, SWF, etc.
Item [27B] OWNERSHIP: Enter N, for Non-Federal; G, for Federal Gov't. Agencies other than the Corps of Engineers; C for Corps of Engineers.
Item [27C] FEDERALLY REGULATED: Enter N for No; Enter Y for Yes.
Item [27D] PRIVATE DAMS ON FEDERAL LAND: Enter N for No; Enter Y for Yes.
Item [27E] ASSISTANCE BY SOIL CONSERVATION SERVICE: Enter N for None; T for Technical Assistance; F for Financial Assistance; B for Both Technical and Financial Assistance.
Item [27F] VERIFICATION: Date the data was verified as being complete and correct. Enter date as described in Item [12].

LINE 4:

Item [ ] MARKS: Preface remarks with the item [ ] which it pertains, e.g., 22-ORIGINALLY CONSTRUCTED [ ] ING BASIN. Only one remark [ ] d for PART I remarks.

2

PART I – INVENTORY OF DAMS IN THE UNITED STATES
(PURSUANT TO PUBLIC LAW 92–367)

See reverse side for instructions.

IDENTIFICATION

[2] DIVISION	[3] STATE	[4] COUNTY	[5] CONGR DIST	[6] STATE	[7] COUNTY	[8] CONGR DIST	[9] NAME
NAD	NJ	027	13				UNTERMEYER DAM

[13]

IDENTIFICATION (Continued)

POPULAR NAME
UNTERMEYE

LOCATION

[15] REGION	[16] BASIN	[17] RIVER OR STREAM	NEARE CITY –
02	03	EAST DITCH	PEQUANNOCK

STATISTICS

[21] TYPE OF DAM	[22] YEAR COM-PLETED	[23] PURPOSES	[24] STRUC-TURAL HEIGHT (ft)	[25] HYDRAULIC HEIGHT (ft)	IMPOUNDING CAPAC MAXIMUM (acre – ft.)
RE	1915	R	20	20	160

[28]

REMARKS

REMARKS
26-27-ESTIMATED

ENG FORM 4474

[1]

Y OF DAMS IN THE UNITED STATES
T TO PUBLIC LAW 92-367)

se side for instructions.

STATE	IDENTITY NUMBER				
1	2	3	4	5	6	7
N	J	0	0	2	5	3

[9] [10] [11] [12]

NAME	LATITUDE (North) ° /	LONGITUDE (West) ° /	REPORT DATE DAY MO YR
ERMEYER DAM	40 58 3	074 20 2	05 JUL 78

[14]

NAME OF IMPOUNDMENT
UNTERMEYER LAKE

[18] [19] [20]

NEAREST DOWNSTREAM CITY - TOWN - VILLAGE	DIST. FROM DAM (mi)	POPULATION
PEQUANNOCK	1	15000

[23] [24] [25] [26] [27] [27A] [27B] [27C] [27D] [27E] [27F]

PURPOSES	STRUCTURAL HEIGHT (ft)	HYDRAULIC HEIGHT (ft)	IMPOUNDING CAPACITIES MAXIMUM (acre - ft.)	IMPOUNDING CAPACITIES NORMAL (acre - ft.)	CORPS ENGR. DIST.	OWN.	FED. R.	PRV/FED	SCS A.	VERIFICATION DATE DA MO YR	BLANK
	20	20	160	160		N	N	N	N	05 JUL 78	

[28]

REMARKS

2

PART II – INVENTORY OF DAMS IN THE UNITED STATES
(PURSUANT TO PUBLIC LAW 92-367)

See reverse side for instructions.

STATISTICS

[29] D SHAZ	[30] CREST LENGTH (ft)	[31] SPILLWAY TYPE	[32] SPILLWAY WIDTH (ft)	[33] SPILLWAY MAXIMUM DISCHARGE (cfs)	[34] VOLUME OF DAM (CY)	[35] POWER CAPACITY INSTALLED (MW)	[36] POWER CAPACITY PROPOSED (MW)	[37] NO.	[38] LENGTH (ft)
1	320	U	40	325	1000				

MISC DATA

[46] OWNER	[47] ENGINEERING BY
PB BROOKS AND JF PODESTA	

MISC. DATA (Continued)

[49] REGULATORY AGENCY: DESIGN	[50] REGULATORY AGENCY: CONSTRUCTION	REGULATORY AGENCY: O
NJ DEP	NJ DEP	NJ DEP

MISC. DATA Continued)

[53] INSPECTION BY	[54] INSPECTION DATE DAY	MO	YR
LANGAN ENGINEERING ASSOC INC	03	JUL	78

REMARKS

[56] REMARKS

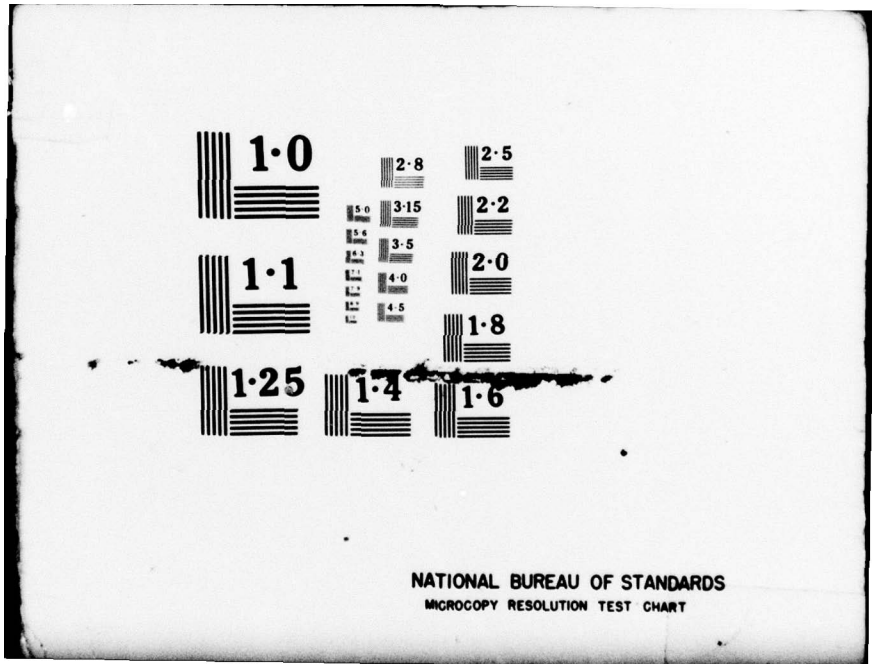
ENG FORM 1 DEC 77 4474A

AD-A058 916 LANGAN ENGINEERING ASSOCIATES INC CLIFTON NJ F/G 13/2
NATIONAL DAM SAFETY PROGRAM. UNTERMEYER DAM (NJ00253), PASSAIC --ETC(U)
JUL 78 D J LEARY DACW61-78-C-0124

UNCLASSIFIED NL

2 OF 2
ADA
058916

END
DATE
FILMED
11-78
DDC


1·0
1·1
1·25
2·8
3·15
3·5
4·0
4·5
5·0
2·5
2·2
2·0
1·8
1·4
1·6
NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

[1]

ORY OF DAMS IN THE UNITED STATES
ANT TO PUBLIC LAW 92-367)

verse side for instructions.

STATE	IDENTITY NUMBER				
1 2	3	4	5	6	7
NJ	0	0	2	5	3

[34] [35] [36] [37] [38] [39] [40] [41] [42] [43] [44] [45]

VOLUME OF DAM (CY)	POWER CAPACITY		NAVIGATION LOCKS								BLANK
	INSTALLED (MW)	PROPOSED (MW)	NO.	LENGTH (ft)	WIDTH (ft)	LENGTH (ft)	WIDTH (ft)	LENGTH (ft)	WIDTH (ft)	LENGTH (ft)	WIDTH (ft)	
1000												5

[47] [48]

ENGINEERING BY	CONSTRUCTION BY	
DESTA		6

[50] [51] [52]

REGULATORY AGENCY

CONSTRUCTION	OPERATION	MAINTENANCE	
JDEP	NJ DEP	NJ DEP	7

[54] [55]

	INSPECTION DATE			AUTHORITY FOR INSPECTION	
	DAY	MO	YR		
USSOC TNC	03	JUL	78	FL 392 267	8

[56]

REMARKS

	9

2

PART II:

Item [1] IDENTITY Enter Identity per GENERAL INSTRUCTIONS on PART I.

LINE 5:

Item [29] D/S HAZ: Enter the digit that most closely represents the hazard potential that could occur to the downstream (D/S) area resulting from failure or mis-operation of the dam or facilities.

HAZARD POTENTIAL

CATEGORY	LOSS OF LIFE (Extent of Development)	ECONOMIC LOSS (Extent of Development)
3 = Low	None expected (No permanent structures for human habitation)	Minimal (Undeveloped to occasional structures or agriculture)
2 = Significant	Few (No urban developments and no more than a small number of inhabitable structures)	Appreciable (Notable agriculture, industry or structures)
1 = High	More than few	Excessive (Extensive community, industry or agriculture)

Item [30] CREST LENGTH: Enter, to the nearest foot, the crest length of the dam which is defined as: the total horizontal distance measured along the axis at the elevation of the top of dam between abutments or ends of dam. Note that this includes spillway width, powerhouse sections, and navigation locks where they form a continuous part of the dam water retaining structure. Detached spillways, locks, and powerhouses shall not be included.

Spillway:

Item [31] TYPE: Enter the one letter code that applies.

CONTROLLED = C UNCONTROLLED = U NONE = N

Item [32] WIDTH: Enter to the nearest foot, the width of the spillway available for discharge when the reservoir is at its maximum designed water surface elevation.
Item [33] MAXIMUM DISCHARGE: Enter the number of cubic feet per second which the spillway is capable of discharging when the reservoir is at its maximum designed water surface elevation.

Volume of Dam:

Item [34] VOLUME OF DAM: Enter the total number of cubic yards occupied by the materials used in the dam structure. If volume of separate materials is known, enter in remarks. Include portions of powerhouses, locks and spillways only if integral with the dam and required for structural stability.

Power Capacity:

Item [35] INSTALLED: Enter installed capacity to one tenth (1/10) Megawatt as of the report date.
Item [36] PROPOSED: Enter the future additional capacity proposed to one tenth (1/10) Megawatt.

Navigation Locks:

Item [37] NUMBER: Enter the n

Item [38] LENGTH: Enter to th

Item [39] WIDTH: Enter to th

Item [40] thru [45] Enter the le

Item [46] OWNER: Enter name
Item [47] ENGINEERING BY:
Item [48] CONSTRUCTION BY
viate as required.

Regulatory Agency:

Item [49] DESIGN: Enter the
design of the dam. If no organiza
indicate NONE.
Item [50] CONSTRUCTION:
tion responsibilities over the con
tion responsibilities over the con
Item [51] OPERATION: Ente
control, or surveillance responsi
authority, operational control o
Item [52] MAINTENANCE:
tion or surveillance responsibili
authority or inspection or surve

Inspection:

Item [53] BY: Enter the nam
inspection has been performed
Item [54] DATE: Enter the
when the inspection was perfo
Item [55] AUTHORITY FO
cated in Item [53], e.g., P.L.

Item [56] REMARKS: Pref
e.g. earthfill. Only one Rema

that could occur to the downstream

ECONOMIC LOSS
(Extent of Development)

Minimal (Undeveloped to occasional structures or agriculture)

Appreciable (Notable agriculture, industry or structures)

Excessive (Extensive community, industry or agriculture)

ich is defined as; the total horizontal
r ends of dam. Note that this includes
part of the dam water retaining struc

NONE = N

charge when the reservoir is at its maxi-

the spillway is capable of discharging

aterials used in the dam structure. If
locks and spillways only if integral

report date.
0) Megawatt.

Navigation Locks:

Item [37] NUMBER: Enter the number of existing navigation locks for the project.

Item [38] LENGTH: Enter to the nearest foot the length of the navigation lock.

Item [39] WIDTH: Enter to the nearest foot the width of the navigation lock.

Item [40] thru [45] Enter the lengths and widths of additional locks.

LINE 6:

Item [46] OWNER: Enter name of owner. Abbreviate as necessary.
Item [47] ENGINEERING BY: Enter name of organization that engineered the main dam structure. Abbreviate as required.
Item [48] CONSTRUCTION BY: Enter name of construction agency responsible for construction of main structure. Abbreviate as required.

LINE 7:

Regulatory Agency:

Item [49] DESIGN: Enter the name of the organization other than the owner having regulatory or approval authority over the design of the dam. If no organization other than the owner has regulatory or approval authority over the design of the dam indicate NONE.
Item [50] CONSTRUCTION: Enter the name of the organization other than the owner having regulatory authority or inspection responsibilities over the construction of the dam. If no organization other than the owner has regulatory authority or inspection responsibilities over the construction of the dam indicate NONE.
Item [51] OPERATION: Enter the name of the organization other than the owner having regulatory authority, operational control, or surveillance responsibilities over the operation of the dam. If no organization other than the owner has regula authority, operational control or surveillance responsibilities over the operation of the dam indicate NONE.
Item [52] MAINTENANCE: Enter the name of the organization other than the owner having regulatory authority or inspection or surveillance responsibilities over the maintenance of the dam. If no organization other than the owner has regulatory authority or inspection or surveillance responsibilities over the maintenance of the dam indicate NONE.

LINE 8:

Inspection:

Item [53] BY: Enter the name of the organization that performed the last safety inspection. Abbreviate as required. If no inspection has been performed enter NONE.
Item [54] DATE: Enter the one (1) or two (2) digits for day, the first three (3) letters of the month and a two (2) digit year when the inspection was performed. If not applicable, leave blank.
Item [55] AUTHORITY FOR INSPECTION: Enter the legislative or regulatory authority for performing the inspection indicated in Item [53], e.g., P.L. 92-367; Div 3, Water Code, State of Calif; ER 1110-2-100; etc.

LINE 9:

Item [56] REMARKS: Preface remarks with the item number to which it pertains. e.g., 34, 500,000 c.y. conc. 475,000 c.y. earthfill. Only one Remarks line should be used for PART II remarks.

APPENDIX 6

REFERENCES

UNTERMEYER DAM

APPENDIX 6

REFERENCES

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5. Lucey, C.S., 1972, Geology of Morris County in Brief, State of New Jersey, Bureau of Geology and Topography, Trenton, New Jersey, 13 pp.

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8. United States Dept. of Agriculture, Soil Conservation Service SCS National Engineering Handbook Section 4 Hydrology NEH-Notice 4-102, August 1972.

9. United States Dept of Agriculture, Soil Conservation Service, Somerset, N.J. Urban Hydrology for Small Watersheds, Technical Release No. 55, January 1975.

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12. Widmer, K., 1964, The Geology and Geography of New Jersey, Volume 19, The New Jersey Historical Series, D. Van Nostrand Co., Inc., Princeton, New Jersey, 193 pp.

13. Wolfe, P.E., 1977, The Geology and Landscapes of New Jersey, Crane, Russak & Company, Inc., New York, New York, 351 pp.